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ORIGINAL LECTURES.

THE DRAINAGE QUESTION IN PHILADELPHIA.*

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NOTHING is so dear to the heart of the patriotic citizen as the conviction that his own town has a smaller death-rate than other towns have. The patriotic citizen of Philadelphia, if we can trust the statistics, has, in this regard, ground for great contentment.

Measured by the statistical scale, Philadelphia stands on this score almost, if not quite, at the head of the list of the larger cities of the world. While no one, I am sure, would wish the death-rate of this city increased, all thoughtful persons who consider the subject must wish that, in some other way, such a stimulating action as a high death-rate produces might exert its influence among your people, and, through them, upon your rulers.

There are several very good reasons why the death-rate in Philadelphia should be a low one.

Much of the more closely built portion of the city is on a soil that is naturally well drained, so that the deteriorating influences of excessive soil-moisture are not active here; but far more important than that is the fact that, with rare exceptions, there is nowhere in Philadelphia anything approaching to overcrowding. Slums hardly exist to such an extent as to affect the average health of the whole city. Certainly in no other city in Christendom does anything like so large a proportion of the population live by day, and sleep by night, in rooms opening directly to the outer air.

Could these most favorable conditions be preserved, and could everything relating to water-supply and to the removal of waste matters be reformed in accordance with the best modern light on the subject, I believe that the death-rate would be, not eighteen or twenty per thousand, as it is now, but not more than eleven or twelve per thousand. In other words, I believe that if the sanitary conditions of Philadelphia were made in all respects as good as they might be made, the avoidance of preventable deaths would amount to about twenty per day. In the presence of such appalling and constant sacrifice of human life as these figures indicate, it would seem hardly necessary to add anything further in the way of argument; but it should not be forgotten that every death, from the class of diseases especially involved, means, on an average, twenty cases of sickness, and not less than four hundred days of suffering and loss of productive time on the part of the patient and the attendant;—not less, on the average, than one hundred dollars of actual outlay, and, over and above all this, such an amount of anguish, disheartening, and demoralization as greatly to lower the effective value of the whole community.

If these figures are to be trusted, though we disregard, as being too familiar to move us, the 7000 unnecessary annual deaths and the 140,000 cases of preventable sickness and about 3,000,000 days of lost time, it is still worth while to consider, as being a more practical question, that the actual expenditure of money occasioned by all these deaths and by all this sickness is not less than $700,000 per annum, being the annual interest, at seven per cent., of $10,000,000,—a sum which, great though Philadelphia is, and difficult though its problems, would go a very long way toward giving its people clean water to drink, dry air to live in, and pure air to breathe.

What concerns us this evening is the supplying to this town of *pure air to breathe*. That, with dry air to live in, where the contamination of the water-supply is not in question, is the final outcome of the whole business of sanitary drainage. This may seem to the common mind, accustomed from childhood to foul streets, stinking outhouses, and close and stuffy dwellings, a very fanciful object to be sought with so much clamor and to be attained only at the end of such great expenditure; but it is a fact, nevertheless, that sewerage and house-drainage, in so far as they relate to the removal of organic matter, seek only to establish a constant condition of purity in the atmosphere in which we live, in-doors and out of doors.

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In working towards this cherished result, all communities, especially all large communities, are very apt to begin their operations at the wrong end. London, Boston, and Buffalo are conspicuous examples of this. In London millions of pounds have been spent on great intercepting sewers and outlet works, more or less effective,—rather less than more, as the issue already shows. The whole question of interior drainage, the drainage of houses as well as of streets, has been left to the haphazard and ignorant control of the church vestries, which are in such matters the only local authority governing and protecting the interests of the aggregated communities of which London is made up. However completely the great works of the Metropolitan Commission may have fulfilled the expectations of their designers, the local sewerage, and in a great degree the house-drainage, of the whole of London is shamefully and dangerously bad.

Boston, as a preparation for future improvements, and to get rid of the bad smell on its shores and of the dirty look of its harbor, has spent, *without materially affecting its sanitary condition*, an amount of money which, judiciously applied, might have reduced the death-rate by at least five in a thousand. That is to say, it might have saved nearly two thousand unnecessary deaths every year, obviating at the same time the loss and suffering that these deaths imply.

Buffalo, too, with the gravest need for an improvement of its local drainage, for the reformation of work which has grown up as best it might with a rapidly-growing town, a town too busy in money-making to pay much attention to the way in which its drains were laid, and where the execution of public work has by no means always been guided by good judgment and rigid virtue,—Buffalo is now spending about a million dollars to purify a branch of the Erie Canal which runs more than a mile up into its manufacturing and railroad quarter. I am connected with the building of this sewer myself, and the money that it will have cost is being most carefully and honestly disbursed by a good and faithful Commission. It will purify the canal, and it will furnish for all time a perfect outlet for all of the foul wash of the city. At the same time I think, and I have always maintained, that *as a sanitary improvement* its building *at this time* is an injudicious expenditure of money.

There is something about fine engineering works which appeals to the heart not only of the engineer who designs it, but of the councilman who votes for it and of the citizen who is taxed for it.

The money paid for this Buffalo sewer —and the same may be said of the works in Boston and in London—has been paid without a murmur. Had it been proposed to spend a like amount on a reformation of the local drainage of either city, there would have been no hope of carrying the project through, for reasons obvious to those who have tried the experiment with the average City Council, and who know the influences under which public money is too often appropriated.

Some years ago, in a discussion about a modest sanitary improvement in this city, one who knew much of the corrupt ways of that time—now happily passed—said that the only possible way of getting anything done would be to get up a grand and comprehensive scheme in which five million dollars would be honestly spent and through which five millions might be safely stolen. I must say, however, that, with a considerable experience in dealing with city governments, it has seemed to me that if these large sums were being abstracted by those who control the government, their means for concealing their peculations were very complete. I have generally been led to ascribe the almost universal indifference of City Councils to all questions of drainage not to cupidity, but rather to stupidity,—that stupidity which prevents our fellow-man from seeing things as they appear to us.

To take up now the question of the proper drainage of Philadelphia, let us consider the actual conditions to be met.

Nearly the whole of the old city, and a large portion of the present business quarter outside of the old limits, lie from twenty to forty feet above tide-water, an elevation ample for good drainage. The rise and fall of the tide in the rivers is over six feet. Formerly there were numerous small streams rising and running for their whole course within the present city limits. The country north of the city is drained by natural watercourses of its own.

The small watercourses referred to have been converted into brick sewers. In the newer parts of the city there are several

streams of considerable volume, and their proper treatment is a very important element of the engineering problem now demanding attention. In some of that territory there existed already sewers, which were almost always bad in design and in construction.

A conspicuous peculiarity of the sewerage-work thus far done in this city is its great uniformity. If we except very large main sewers, occupying the courses of ancient streams, nearly all of the sewers are built now precisely as they were built forty years ago. They are almost always round, and are almost always three feet in diameter, rarely two feet six inches. They are built with a single four-inch ring of brick, the lower half of which is generally laid without mortar directly upon the earth excavated to receive it. The upper half is laid with mortar, and is built over supporting "centres" of true form.

The means of connecting house drains is a sort of "go as you please." There is no effective control on the part of the city officials over the sizes of pipes, the depth or grade to which they shall be laid, or the manner of connecting them with the brick-work.

My assistant, Mr. Baldwin, who made for me an examination of some of the Philadelphia sewers a few years ago, describes the free-and-easy way of making these connections. He says, "The customary manner of making connection with a sewer is to knock a hole in it with a bar or hammer, and, after placing the connecting-pipe, to put a few loose bricks above the broken place and fill up with earth. These loose bricks are soon displaced by rats, the earth caves, and the sewer itself sometimes falls in."

This work is constantly causing serious obstructions and sometimes actual stoppages of the sewers. The lower half of the sewer being laid without cement, so much of the liquid part of the sewage as the soil is able to receive is freely transmitted to it. Water is carried in street-gutters for certain distances, and then, with the interposition of that most offensive of all of the engineer's devices, the ordinary "inlet-basin," is let into the sewer, carrying with it so much of its sand and rubbish and filth as is able to pass the trap of the inlet. The rest remains in the basin, to putrefy before the eyes and under the noses of the people.

The sewers are, in nearly all cases, so large, as compared with the surfaces that they have to drain, that their stream is never able to wash them clean, so that deposits are frequent and often considerable,—deposits not of mere dirt as we see it in the street, or of mere refuse as we see it in the gutters, but stagnant and putrid, as such matters are sure to become under such circumstances.

Concerning the removal of the deposits retained by the inlet-basins themselves Mr. Baldwin says, "This is done by removing the cast-iron covers and shovelling up the deposit into the street, where it is left to drain until it is carried away by the street-cleaning contractor or scattered by the wheels of passing carriages."

In many parts of the city the deposits are enriched with the household slops, from kitchen, laundry, and chamber, which are thrown into the street-gutters. This flow, not dangerous but certainly unattractive so long as it runs in the gutters, under the open sky, becomes a source of added danger when mingled with the other foul deposits of the basin and of the sewer. The practice of sending house-slops into street-gutters is so common that there are few streets in the city which are free from such abuse, and nearly all of the inlet-basins are thus converted into cesspools filled with indescribable filth. From the markets and from the fish- and fruit-stands other objectionable wastes are contributed to the mass.

The sewers are provided with man-holes at intervals. These are rarely opened, and they are not useful for ventilation. Mr. Baldwin says, "The sewers are, therefore, practically without any ventilation, and on raising one of these covers the rush of vapor, gas, and sometimes of steam is so great that some time must pass before one can look down into the sewer and see anything. Within the past few years some grated covers have been used for new sewers, but no attempt has been made to substitute them in the old ones. In fact, most of the old sewers are so offensive that it is doubtful if perforated covers could be used without creating a nuisance for some time.

"The accumulation of gas in the branch sewers of Philadelphia is rendered unavoidable by their shape and size, and by the lack of ventilation. A sewer circular in section, with a diameter of three feet, cannot be kept clean until the flow of

water becomes several inches deep. So much kitchen and laundry water is turned out on the surface of the ground and exposed to the air in the street-gutters and basins that the supply for washing out the gutters is greatly reduced by evaporation, while the deposit gradually accumulating in the branch sewers retards the flow, and by its decay is constantly contributing to the supply of sewer-gas."

Let me call to your attention the fact that I am not describing sewers in New York, or in Boston, or in some old Continental town, but that I am describing the conditions which actually exist at this moment here in your own city of Philadelphia,—probably on all four sides of the block on which we now stand, and substantially on all four sides of all the blocks in the most valuable and most fashionable part of the town.

These sewers, far from receiving waste matters produced in houses and industrial establishments in a fresh condition, and conveying them rapidly and completely to their outlets in the rivers, receive much that is putrid when it reaches them, and they foster and continue the putrefaction in their foul interiors, so that their outflow is as offensive as bad arrangement and ignorance and neglect can make them.

This outflow from a population of a million people is delivered into the rivers in a poisonously foul condition. The tidal movement in the Schuylkill is much less active than that of the Delaware, and the condition of its water is obviously more foul. Along the Delaware there are long and solid piers enclosing slips which are only indirectly influenced by the tidal movement, and which contain deposits of putrescible matters. The tide sets up the river about four hours and three-quarters, and down the river about seven hours and a half during each rise and fall, with considerable variation of these periods according as the upper Delaware is running full or slack.

The condition of both rivers, produced by the great quantity of sewage delivered into them, it will be easy for you to examine for yourselves. It is a condition which grows worse as the population increases, and it must sooner or later become intolerable.

So much for the drainage of your streets. Let us now consider the drainage of your houses, remembering the sound sanitary maxim that "the house is the unit of sanitary administration."

House-drainage here may be roughly classed under two categories. First, that still prevalent in very many of the best houses in the fashionable parts of the town; and, second, that adopted in connection with the smaller houses in the newer quarters.

In the first category are houses provided with cesspools, sometimes in their yards and sometimes in their cellars. The local name given to these cesspools is "wells." This indicates very largely their origin. Wells originally supplying good water, but made useless for that purpose by the proximity of shallow cesspools, and also made unnecessary by the introduction of Schuylkill water, have been turned into receptacles for the liquid drainage of the houses. Having been excavated far into the water-bearing strata underlying the city, they serve for a long time, until the gravel becomes clogged, as a means for the discharge of foul liquids. Mr. Baldwin says, on this subject, "The experience thus gained has induced many householders to excavate cesspools deep below the water-bearing surface, so that in many parts of Philadelphia these cesspools—now almost universally called wells—extend to a depth of twenty or thirty feet, and even sometimes many more feet below the surface of the ground. Originally these wells are located in some out-of-the-way part of the lot, in the rear of the dwelling, but as the city grows, and new houses are built and streets opened, it is more likely than not that the rears of large building-plots become the fronts of smaller lots, facing on a new street laid out between two old ones. Some of the squares of the original city of Philadelphia have two or three intermediate streets laid out through them. These old wells, dug for drainage purposes, are so deep as to be far below the level of the cellar-bottoms of adjacent houses. It would be very uncharitable and probably untrue to say that wells are ever dug within the walls of a dwelling-house, but it is true that a house is sometimes built over an old well, and, instead of its being cleaned out and filled in, it is still used to receive the drainage of the new house. The locations of the pipes leading into the well from the old houses, too, are forgotten, and, unless they happen to be uncovered and cut off in digging for the foundation of the new

one, the underground-drainage of an area once forming a plot of considerable size, owned and occupied by a single family, is now so complicated and forgotten that nobody knows or cares anything about it. Such old, forgotten house-drains are frequently found in rebuilding old houses, and in extending the foundation to a greater depth than before. The earth beneath and around them is usually discolored for a distance of several feet in all directions from the drain. An instance of this kind was observed in the excavation for the foundation of a house being rebuilt on Market Street, below Eleventh, where an old drain was cut off, exposing a considerable extent of black- and green-colored clay beneath the level of the old foundation. In excavating for the foundation of an extension of a dwelling on Twelfth Street, not far from Vine, two old wells were uncovered directly in the line of the foundation walls, and only twelve to fifteen feet apart. As they were filled with a black, soft, oozy matter, and were apparently bottomless, the usual practice common among builders was resorted to,—viz., to turn an arch over the well to sustain the wall of the house above it, and let it remain, disturbing its contents as little as possible on account of the sickening stench given out when moved. An example of a well entirely within the walls of a house, and still used to receive its drainage, was observed not long since in the cellar of a house on Race Street, below Twelfth. Workmen were cleaning out the deposit of black, greasy, putrescent matter, having first dipped out the liquid matter in buckets and poured it into the street-gutters. After emptying the well, the workmen measured its depth with a tape-line, and pronounced it to be twenty-seven feet below the board floor of the cellar, and said it extended to gravelly bottom and was walled up with brick. It might be presumed that, as the sewerage is extended, householders would make connections at once, and dispense with the cesspool or privy-well; but this is seldom true. It is only when the soil about the well becomes so saturated that it will no longer allow the liquid contents to soak away, and hence the frequent visits of the scavenger become troublesome and expensive, that any remedy is sought, and then the first step in improvement is to lay an overflow-pipe from the well, so that when full the liquid contents may run over and discharge through the pipe into the street-sewer."

Some years ago I read a paper on a sanitary subject in this city, and at its close I was invited by a gentleman living on one of your best streets, and near this building, to examine the condition of his drainage-works, which he obviously considered very perfect and instructive, on which he had expended much money, and which included a remarkable complication of waste-pipes and ventilation-pipes. The discharge of most of the drainage of the house was into a well in the cellar, under the dining-room, and it was considered a conclusive argument in favor of the system that that well had served for many years, with little attention, as a satisfactory means for removal!

In the second category are those houses which, with no direct communication with the sewer, deliver the drainage of kitchen, laundry, and bath-room into a privy-vault placed at the back of the lot, discharging its outflow, made foul by putrefaction and by the maceration of its solid constituents, into a sewer in the alley or street adjoining.

These may be considered, roughly, the two methods for getting rid of the foul wastes of houses throughout the city,—though direct communication with the sewer is not unusual. In very many cases there is a combination of the two methods,—a discharge of a portion into deep wells and of another portion into the overflowing privy-vault. If a judicious and proper connection of plumbing work with even tolerable sewers exists anywhere within the city, it is the exception rather than the rule. Mr. Baldwin's careful and long-continued examination failed to develop such a practice sufficiently extensive to be considered at all characteristic.

The foul wastes of a house are generally produced near its rear. Frequently the only possible connection with the sewer is at the front. The drainage is usually conducted from rear to front by a drain of earthen-ware pipes, much too large, being for a single building often eight, ten, or even twelve inches in diameter, laid in the ground underneath the cellar, and very often imperfectly laid and ineffectively jointed. Mr. Baldwin says, "A privy-vault in the back yard serves to accommodate the occupants of the house, or to receive the drainage from water-

closets, if any, in the upper stories. The vault is washed out by rain-water led to it from so much of the roof as inclines toward the rear. A terra-cotta or earthenware pipe, from eight to twelve inches in diameter, serves as an overflow to carry away the liquid contents of the vaults, passing under the cellar, buried about one or two feet in the ground. The waste-pipe from the sinks on each floor connects with and discharges into the main drain-pipe beneath the cellar. A hydrant in the back yard affords a supply of water for all purposes, principally for the laundry, which, in the summer season, is usually in the open air. Beneath the hydrant is a slop-stone with an iron grating through which the waste from the hydrant, the drainage from the yard, and the water from the wash-tubs pass underground to the same house-drain beneath the cellar. This is the common practice of drainage where houses present a solid front on the street and have no means of drainage to the rear. It may be seen in much of the older part of the city, and, in fact, all along the Delaware front below Fourth Street, and elsewhere."

In some cases, as an improvement on this system, there is a passage-way between each two houses, of which the pavement is depressed in the centre, and nearly all the drainage, except that from water-closets, there flows over the surface.

Mr. Baldwin further says, "There is a strong popular prejudice in Philadelphia against connecting dwellings directly with the sewers, doubtless caused or encouraged by the bad atmospheric condition and entire absence of ventilation of the public sewers. But, on the other hand, the custom is almost universally practised of turning sink- and slop-water on the ground, allowing it to flow across the side-walks and stagnate in the street-gutters."

I refrain from entering into a consideration of the wide prevalence of outside privies and vaults in many parts of the city, and of the offensive methods of removal of their accumulations, — which even the modern pneumatic process has been able only to mitigate, not to correct,—and confine myself exclusively to the ineffective attempts thus far made to secure a removal of liquid drainage by house-drains and sewers.

Perhaps a difference of training may lead you and me to take a different view of the seriousness of this question. You have lived all your lives subject to the system that I have described, and familiarity may well have made you tolerant of its defects. To one without such familiarity, the systems here prevalent can only seem altogether bad.

Our time will not permit us to go into the *details* of that part of the plumber's work in your city which has for its purpose the reception and removal of foul wastes. Some acquaintance with this work, obtained in the professional inspection of houses, leads me to the belief that this part of your system is hardly better than that which has been described more fully.

I trust that I shall be acquitted of any inclination to be sensational in what I have said. I am sure that I have not overstated the defects of your system, and any unpleasant sensation that my remarks may have produced must be ascribed solely to the inevitable effect of a moderate delineation of actual conditions.

The question naturally arises, What is the remedy for all of these defects? This is a very difficult question to answer. It involves the improvement of methods of plumbing, the reorganization and reformation of the existing sewer system, and, almost more serious than all, the devising of some means by which the liquid wastes of this vast and busy population, with all its houses, its shops, and its factories, and the added wastes of the great increase of population that is sure to come in the future, can be so disposed of as to be placed beyond the power of doing harm, either to the people of the city itself, or to those of other localities past which it must be carried, or in which it must finally be destroyed.

A complete answer would involve probably a possession of more knowledge than now exists. None the less is it incumbent on those who regulate the affairs of the community to endeavor to secure a solution of this great and vital problem in accordance with such knowledge as we now possess.

It would be fatuous to undertake, on an occasion like this, and in an off-hand manner, even to suggest the details of the great and necessary work of reformation. It seems proper, however, to indicate the line which efforts for improvement should follow.

One cardinal principle should be kept

always in view; that is, that *all organic waste matter should be delivered at its ultimate point of discharge before it has time to begin to putrefy*. This is the one great aim by which all works of sanitary drainage should be regulated. Simple and natural though it seems, it involves a radical departure from the all but universal practice of all communities.

The evil with which we have to contend is an enormous one. It is futile to attempt to combat its forces after they have been collected. They must be fought in detail, and at their recruiting stations,—in the houses,—and while single-handed.

A bit of broken meat, or other refuse matter, taken by itself, is not serious; if, driven immediately from its point of origin without being allowed a moment's halt by the way, we can secure its transmission to the distant outlet of a system of sewers, we get rid of it before it becomes serious. If, on the other hand, we allow it to lie in an inaccessible large trap, involved with congealing grease and associated with other refuse, the mass becomes immovable under the force of the stream ordinarily applied to it. It is slowly reduced by maceration and by putrefaction, evolving foul odors of decomposition, and, oozing away with the flow in a condition already mischievous, it goes on from bad to worse along the whole of its sluggish course. Much of it, often most of it, is decomposed, disintegrated, and turned into objectionable vapors before the outlet is reached. What is true of a bit of broken meat is true of other solid wastes. In the case of foul liquids of all sorts, unless the removal is complete, the resulting conditions are at least no better.

As it is with the houses so it is with the block, which is an aggregation of houses, and which is drained by a single channel that receives from each an addition to its injurious contents. Thus the condition of the sewer becomes foul and objectionable.

We have been taught to dread above all things else that enemy so universal in cities,—"sewer-gas." We have been taught to protect ourselves against its invasion of our houses by all manner of traps, ventilation-pipes, and disconnections. A careful examination of the drains of any house will show that the origin of this sewer-gas which we dread is not so much in the sewer as in the pipes of the house itself. We see that the very means adopted to prevent its intrusion from the sewer have often been added means for fostering its formation in our own drains.

We shall find in nearly all cases that traps, whether under sinks and closets or elsewhere, are too large to be washed clean by the flow of their ordinary supply of water. Probably the most usual diameter of the traps and waste-pipes of kitchen and pantry sinks, which are subject to obstruction by grease, is two inches. Under the best circumstances the grease accumulates till the water-way is reduced often to an effective diameter of less than one inch: that is, to one-quarter of the capacity of channel of the two-inch pipe. It is unlikely that any sink through which greasy hot wastes are discharged, even if its waste-pipe were only one inch in diameter at the outset, would send water through its strainer fast enough to keep this one-inch pipe free, though, of course, the difficulty would here be much less in degree than with the larger channel. In either case the water-way is surrounded, not by a lead surface, as we may fondly suppose, but by a surface of deposited greasy filth.

The traps under our closets must necessarily be large, because here a considerable water-way is required. As the difficulty in this case cannot be mitigated by contracting the size of the channel, it must be remedied by increasing the volume of water sent suddenly through it. Pan-closets and other closets which are flushed by a small stream, generally directly from the supply-pipe, are never provided with so copious a supply of water as is necessary to remove their deposits, which, therefore, remain until putrefactive processes have set in and until mischief is begun.

Putrefaction, whether of accumulations in traps and in pipes or of the mere sliming of the pipes, is of much more injurious character when carried on without the free access of atmospheric air than when such access is provided. Probably not one soil-pipe in one hundred in Philadelphia, or in any other old city, has a thorough ventilation: that is, a means for taking in air at one end and delivering it at the other. The mere carrying of the top of the soil-pipe, even at its full diameter, through the roof of the house, does not secure ventilation. This requires that

there should be an opening in the lower end as well, so that air may flow in at one end and out at the other. The movement need not be rapid,—indeed, it may be very slow,—but it must be constant. However our pipes may be arranged, we may be sure, if the upper end is open to the sky and if the lower end is open to the outer air or to the sewer, that there will be a constant movement, however slow at times, and that an adequate amount of fresh air to maintain a complete and wholesome decomposition, at least of the inevitable sliming of the walls of the pipe, will be secured.

It would be sound advice to give to every householder, whether his work be costly or cheap, elaborate or simple, to say that his main line of communication, the soil-pipe, should have such a free movement of its contained air as has been indicated; that its branches should all be small, so that the flow through them will be a cleansing flow, carrying all foreign substances immediately and completely through them; that, if these branches are long, they too should be ventilated with pipes leading to the outer air; that no trap should under any circumstances be larger than the pipes with which it communicates (it may often be smaller with advantage); that every fixture that is used should at each use deliver water enough to furnish an effective vehicle for all waste matters discharged with it; that every line of communication between a fixture in the house and the soil-pipe should be so effectively trapped that the passage of air from the waste-pipe into the house through the fixtures shall be and shall always remain impossible; and that, if a trap on the main drain, cutting it off from the sewer, is needed (and it is often needed in this city), a special inlet for fresh air should be supplied.

However this advice may be applied, if applied thoroughly, while there may still be disagreeable odors from sloppage, from foul fixtures, and from foul overflows, the sanitary condition of the drainage-works of the house in which it has been faithfully followed may be regarded as sufficiently safe. Home-made sewer-gas, which is the bane of most houses, will not exist there.

If this improvement can be made in one house, it can be made in all the houses of the block, and in all the blocks of the city. We may have the foulest possible condition of the street sewers and of the wharves and slips and rivers, and our nostrils may be accosted with foul odors from open manholes and inlet-basins; yet we may be sure that in our houses we are safe.

It is assumed, of course, that all vaults, cesspools, and foul "wells" are to be completely eradicated as soon as other means of discharge shall have been provided.

If, on the other hand, houses are left in their present condition and subject to their present grave drawbacks, we may spend as much money as we like on disposal works and main sewers and branch sewers without very materially modifying the sanitary conditions to which we are most subject and most sensitive. Here, then, should be the point of departure of the reform.

Before men are taxed for the building of sewers in their streets, they should be compelled by a rigorous health authority to tax themselves to make the interior drainage of their houses safe. It cannot be questioned that every dollar spent here—spent in getting beyond our own walls the material without whose retention organic putrefaction cannot take place—will have far more influence on the health-rate and on the death-rate of the people than will a larger sum spent on the sewers before their doors.

The house itself having been rendered fit for human habitation, the next care should be given to its immediate surroundings. The cesspool in the yard and the vault under the privy—seats, both of them, of the vilest and most dreaded decomposition—should be absolutely abolished. The uses which they now serve should be served by the public sewer. Better the worst sewer in town, properly barricaded by good house-drainage, than the ordinary cesspool and vault with their greater accumulation of filth.

The houses being drained and being brought into communication with the public sewer, then—and in my judgment not till then—attention should be given to *public* works of drainage. Even then, let us continue with the idea fast in our minds that what we have to do is not to take the foul and putrid flow of house-drains and branch sewers and carry it by a perfect main sewer to the river; but, by the con-

struction of proper and properly maintained local sewers, to push on farther and farther from the houses the point at which cleanly and prompt removal gives place to putrefaction.

The local sewers being thus reformed, and all their contents being in a condition of free movement, with an entire absence of decomposition, then—and not till then—can we with the best advantage undertake the work of reconstructing our main sewers, whose final office it is to continue the free movement of our local sewers, and to carry, well beyond the limits of the town and still in a fresh condition, the wastes which have recently started on their course in the well-flushed sinks and closets of individual houses. It may perhaps be assumed that no house in Philadelphia is or is to be more than five miles away from the outlet of the present main sewers—which under present conditions would be into one or the other of the rivers. Let us assume the maximum distance to be twenty-five thousand feet. With properly constructed house-drains and sewers, the constant and uninterrupted movement of waste matters will be at the rate of at least two feet per second, or one hundred and twenty feet per minute, or over seven thousand feet per hour: so that in less than four hours from the time of its production our refuse food and other wastes will have passed from our houses to the river. Were they to occupy five times four hours, they would undergo no such decomposition as would produce injurious results. Under existing conditions, a large part of the material occupies *five times four days* in making the journey. Much of it never reaches its destination at all, and what does reach there, instead of being mere waste organic matter in a fresh, manageable condition, is a putrid mass of filth, which it has thus far taxed human ingenuity beyond its power to dispose of safely and inoffensively by discharge into rivers.

If you will visit the main outlet of the drains serving the community of fifteen hundred persons collected at the State Insane Asylum at Norristown, where everything of whatever character that is delivered into the drains is discharged at the outlet in a very short time, and will then visit the open mouth of any sewer in Philadelphia, you will understand the difference of condition that I have endeavored to set forth, as no mere description can make you understand it.

The drainage question in Philadelphia involves still another problem of most serious character, based on the probable inability of the shifting waters of the Delaware River to dispose safely of the wastes of a community so large as this is or is in time to become.

Attempts at efficient disposal of foul sewage, on a large scale, by delivery into rivers have thus far failed. London has spent about thirty million dollars in intercepting sewers and pumping stations arranged to deliver its stagnant sewage into the Thames far below the city. The effect on the river has been such as to cause grievous complaint, and a Commission under the presidency of Lord Bramwell has recently reported upon it, condemning the conditions now existing as "a disgrace to the metropolis and civilization." This Commission suggests as a means of remedy an incomplete purification by a chemical process that would cost about a million dollars a year, to be supplemented by further purification by application to the land. Paris is dealing successfully with a portion of its outflow, but it is still at sea as to the best course to pursue with reference to the rest of it. It has been demonstrated there, and at Berlin and Dantzic and elsewhere, that a sufficient amount of suitable land is capable of purifying any amount of effluent, no matter how foul.

If a sufficient area of sandy soil could be provided, and if the sewage of Philadelphia could be transported to it at a practicable cost, the question of disposal would be definitely determined; but the cost would be enormous.

The problem, as it confronts us to-day, can, it seems to me, best be solved by getting rid at the outset of the element of *foulness*,—that is, of all putridity. This being done, and it being a question only of the disposal of *fresh* sewage, the case takes a new aspect and is greatly simplified. All who have been much about the waters in the vicinity of towns know that any object thrown overboard is at once attacked by a multitude of fishes, great and small. If not too hard to be broken up by the attack, unless it is putrid, no matter what its character, the whole of it seems to be consumed. The Delaware is even now sufficiently pure to be frequented

by fishes. No doubt these are an important agency in the destruction of much that now reaches it from the sewers. It cannot be doubted that if all solid waste matter produced in the city, of whatever kind, were carried out into the river by garbage-boats, and there dumped, it would be consumed as ravenously as is the garbage of New Orleans, which is daily dumped on the feeding-ground in the middle of the Mississippi, where schools of fish, of all sorts and sizes, are waiting to struggle for it and, apparently, to consume it on the instant. If all of the solid wastes which are subject to transportation in the flow of the sewers were delivered immediately, *in a fresh condition*, into the Delaware, there seems to be no reason to doubt that the whole of it would be incontinently eaten up, and that, so far as these materials are concerned, the destruction would be as complete as though the material had been thrown into a farmyard for consumption by poultry and swine. Nothing that is not putrid is rejected by these, nor do we reject them from our tables because of the meat on which they have grown. Nothing not putrid would be rejected by the river-scavengers, nor need we consider the nature of their food in using them as food for ourselves.

Probably the capacity of the aquatic life of the Delaware to consume the solid wastes of Philadelphia is, and would long remain, adequate to the task. Unfortunately, solid wastes do not offer the chief, nor the greatest, of the difficulties to be overcome. Foul liquids, or, rather, the foul matters in solution and in suspension in liquids, are much more serious. This matter is widely diffused and is intangible. It is a question by no means to be settled so easily whether or not it would be consumed by the higher organisms on shore or in the water. There is, however, reason to suppose that the whole range of animalcula and algæ, and doubtless the lower organisms and those that fill the intervening space between them and the fully-developed fishes, are also active in converting dead organic matter into a new form of organic life.

The extent to which the processes here indicated are available for practical sewage-purification is still far from being determined. It seems altogether likely, however, that the extent is much greater with matters of recent production than with those which are associated with the products of putrefaction due to stagnation and to delay in transmission. Another unfavorable element, in a manufacturing town, is the quantity and character of some of the chemical wastes of factories. Mr. F. Lamborne Flower, Chief Sanitary Engineer of the Lee Conservancy Board, has written to the *Times*, "as having almost daily experience of sewage-outflows for the last fourteen years, and being the only officer in the kingdom in sole charge, for sanitary purposes, of an entire water-shed," that, "if sewage is to be utilized as food for fish, it must be delivered in a fresh and not in a decomposed condition, and also be free from chemical refuse or improper chemicals used for sewer-treatment. Fish thrive at a sewer-outlet, but those taken near a *foul* drain rapidly become putrid."

It is here, rather than in the drainage of houses and in sewerage, that the uncertainties of the case lie. We have as yet no means of knowing to what degree we can depend on the life of the river to get rid of our solid and liquid wastes. We do know sufficiently well how we can deliver our solid and liquid wastes into the river, while fresh, without offence and without danger.

As a practical question, we know that were the outflow of the sewers fresh, as it might be made, instead of being foul, as it now is, the condition of the river would be immensely improved. Therefore, the prudent course to follow would seem to be to do first that which is necessary to deliver all wastes in a fresh condition, and to take up afterwards the question of ultimate disposal.

So far as we now know, if the river will not permanently dispose of the outflow, it must be disposed of by application to the land,—a process which ample experiment has proved to be absolutely successful.

The necessity for such disposal in your case would involve the sending of the sewage to a distance, requiring, on the score of economy, that it be not diluted with storm-water, which may go directly to the river. It would be necessary, also, to control an ample area of light, porous land. This part of the problem does not now, however, present itself as an imminent one. Assuming that the first thing

to be done is to improve the house-drains and sewers of the whole city, there is reason to hope that important new developments with regard to ultimate disposal will be made before that part of the work will be reached.

In looking over the few, simple statements made this evening, and seeing how free from complication and difficulty each detail of the work of improvement would be, the thought may naturally recur that a great clamor is made for what may seem a fanciful object which can be attained only by great expenditure. Full justification, however, for the most serious attention that can be given to the subject comes without seeking, when we consider the unceasing influence of defects so familiar to us that they may appear slight on the life, the health, the efficiency, and the happiness of the community.

ORIGINAL COMMUNICATIONS.

REPORT ON RECENT PROGRESS IN PHYSIOLOGY.

VULPIAN ON CEREBRAL PSYCHOMOTOR LOCALIZATION.

M. VULPIAN, in a series of communications lately made to the Académie des Sciences, has made statements tending to undermine the belief concerning the functional action of certain cerebral regions known as psychomotor centres, which has been gaining ground since the experiments of Fritsch and Hitzig. It will be remembered that these scientists demonstrated that if a galvanic current is passed along certain regions of the cortical substance, movements are provoked in the limbs of the opposite side or in the opposite side of the face. These regions have been considered as the centres where volition is transformed into nervous impulses. Experiments made by other physiologists confirm those of Fritsch and Hitzig. Charcot and others also observed that lesions of these regions in the human subject provoke paralysis either of the limbs of the opposite side, or of the face. M. Vulpian has recently demonstrated that, after having determined what is the minimum electrical stimulus necessary to apply to the gray substance in order to provoke movements, the same effects are obtainable by a feebler current if *isolated* electrodes (entirely covered with gutta-percha, except at the extremity) are allowed to penetrate the gray cerebral substance until they reach the white matter and stimulate the white bundles. M. Vulpian also affirms that epileptic attacks are likewise provoked by stimulating the underlying white bundles by weaker currents, which last less time than those used for stimulating the surface of the gray substance.

Other experiments made by this distinguished physiologist gave still more striking evidence that the gray cortical substance is of quite secondary importance in the pathogeny of epilepsy; or, in other words, the functional activity of the gray cortical substance is not necessarily invoked. M. Vulpian proved this by freezing the cerebral surface of a dog by means of methyl chloride, and then applying a stimulus which provoked epilepsy. Thus M. Vulpian's researches establish the unreliable character of certain experiments which have been quoted as indications that the motor excitability of the cerebral gray cortical substance exists in certain areas.

It is also evident from M. Vulpian's researches that the hypothesis of cerebral functional localization cannot be based on those experiments. Furthermore, they show that nerve-fibres destined to transmit cerebral motor impulses from certain regions to a limb, for example, may issue from a certain circumscribed limited area without the superposed gray substance being necessarily a defined initiating centre. Since Brown-Séquard's celebrated experiment, which proved that blood injected into the vessels of the head of a dog severed from its body provokes vital manifestations, the question has been raised whether, in virtue of the latent life which was maintained, sensations were felt, though they could not be transformed into initiative phenomena. M. Vulpian, during his series of experiments, observed that in less than a minute after the last heart-beat, neither faradization of the gray cerebral substance nor of the white provoked the slightest movement of either the limbs or the face, though the currents were sufficiently strong to provoke them before death. Much stronger currents provoked contractions, but these contractions were due to a physical transmission of the current from the point electrified—from element to element—to the nerves and mus-

cles. This experiment establishes the accuracy of those which have indicated that among the higher orders of mammals the cerebral substance loses its motor stimulus as soon as the circulation is arrested in the nerve-centres.

CHEMISTRY OF COLLOIDS.

M. Grimaut, the learned professor of chemistry at the École Polytechnique, whose biological researches are always distinguished by remarkable analytical power, has communicated to the Biological Society the results of his researches on colloid substances. Among the interesting facts he exposed are the following. If the product obtained by heating phosphorus perchloride with amido-benzoic acid be submitted to the influence of ammonia, the result is a substance M. Grimaut calls amido-benzoic colloid. It resembles albumen in its behavior to reagents. It coagulates in the presence of acids, salts, and lime-water; also under the influence of heat. A very weak solution does not coagulate under the influence of heat, but the addition of sodium chloride in solution coagulates both substances, the albumen and the amido-benzoic colloid. If a weak solution, after ebullition, be submitted to the influence of carbonic acid, a white coagulum is obtained, which disappears when the carbonic acid is replaced by atmospheric air. This substance is undoubtedly a synthetical albuminoid. M. Grimaut exposed the results of another series of experiments, showing that the time will soon arrive when the history of albuminoids will be known; but whether or not this knowledge will bring with it that of creating living protoplasm is a question M. Grimaut, unlike many other savants, answers in the negative. It is within the limits of science to be able to produce a body possessing all the properties of albuminoids, offering all their reactions, having the same composition, behaving in every way the same, but the vital problem will not be solved. Nothing indicates the origin of the first vital impulse which converts an albuminoid into a living cell. To the chemist there is no appreciable difference between a fecundated and a non-fecundated egg, yet the former is endowed with that motor energy which imparts the vital properties of living and developing which characterize a moving, living organism.

EFFECTS OF HEAT ON MICRO-ORGANISMS.

M. Charles Réchet, at a recent meeting of the Biological Society, stated that heat helps the action of substances that impede or arrest development of micro-organisms. In two bottles of urine, mixed with a few drops of putrid urine, five milligrammes of mercuric chloride were added. One remained in the laboratory, the other was placed in a stove at 40° C. (104° Fahr.). In the former, micro-organisms were developed; the other, which was subjected to heat, remained clear and limpid. During the meeting M. Arloing called attention to the fact that he had previously made known the influence of heat on substances that arrest or impede the development of micro-organisms. His experiments were made with carbolic acid and mercuric chloride and borax, etc., acting on the virus of "charbon" and septic virus.

HISTOLOGICAL WORK AT THE COLLÉGE DE FRANCE.

The yearly volume of the work done at the histological laboratory of the Collége de France has just appeared. It contains a paper from M. Ranvier, the learned principal of the laboratory, on the particular kind of fatty matter that he discovered two years ago in the stratum lucidum of the skin, and named by him *eleidin*. In the present memoir he studies the distribution of this substance in the skin, the buccal and œsophageal mucous membrane of vertebrates. The memoir cannot be analyzed, it is too full of detail; and it is too long to give in full. We will therefore limit our description to repeating M. Ranvier's statement, that in all epithelioma and hypertrophied papillæ *eleidin* is more abundant than in a normal condition. When, in consequence of an inflammatory process, the keratinization of the skin does not operate, *eleidin* is absent.

M. Malassez and M. Vignal also contribute a memoir on the micro-organism of a special form of tuberculosis which these scientists described last year, under the name of *zoöglœic tuberculosis*. M. Malassez and M. Vignal demonstrated that when in tuberculous lesions Koch's bacillus is not discovered, but nevertheless inoculations provoke in animals bacillary tuberculosis or a disease presenting the same course and the macroscopic and microscopic appearances that characterize cer-

tain forms of tuberculosis in the nodules, instead of finding Koch's bacillus, micrococci are observed arranged in glomerate masses or dispersed among the tissues. M. Malassez and M. Vignal, failing in successfully coloring these micro-organisms, considered the following problem unsolved: Is there any relation between the bacillus of Koch and these micrococci, or is the form of tuberculosis they invoke one apart?

In the second memoir published by these histologists (the one that now appears in the yearly volume) they give the following formula for coloring zoöglœic masses: ten parts of carbonate of soda at two per cent., five of distilled water saturated with aniline oil, three parts of absolute alcohol and of methylene blue in solution (made with nine parts of distilled water, and one part of concentrated methylene blue in solution in alcohol at ninety degrees). This fluid stains blue the micro-organisms of the zoöglœic tuberculosis and those of glanders, but no others. The authors conclude that the micro-organism of the zoöglœic masses is quite distinct from Koch's bacillus; also that the two forms of tuberculosis are differentiated one from the other. These data explain the absence of Koch's bacillus in extended lesions which result in death and also present all the macroscopic features of tuberculosis. They likewise indicate the wisdom of being excessively careful in making diagnosis of tuberculosis or declaring its absence when neither Koch's bacillus nor the micrococci of Malassez and Vignal is detected. It is very possible that, besides these two kinds of micro-organisms, others exist, though Koch's bacillus is undoubtedly the most frequently met with.

M. Vignal contributes another paper in the volume. This one is on histogenesis of the elements of the spinal cord, in which he studies the development of the elements of the spinal cord in the higher mammalia and in man. The earliest stages of development were studied in embryos of sheep, it being difficult to obtain human embryos before the sixth month is reached which have not before expulsion been macerating some time in the uterus. M. Vignal recommends studying sections after hardening them with the following mixture: equal parts of osmic acid in solution at one per cent. and alcohol; then embedding in collodion. He finds that with this mixture better results are obtained than with salts of chromium. For dissociation he advises maceration during twenty-four hours in alcohol (thirty-six per cent.). The elements of the spinal cord are then dissociated by simply shaking.

M. Vignal has observed that the elements which exclusively belong to the spinal cord develop quite independently of the mesoblast, and that they proceed solely from the elements of epiblast which constitute the primitive groove. Gray substance appears in the spinal cord towards the twentieth day of human embryonic life; primarily it constitutes two kinds of ridges on each side of the spinal cord. Its component cells are not defined: that is to say, they do not present definite characteristics. About the tenth week of fœtal life some of these cells present the features special to nerve-cells. The cells in the anterior horns are first differentiated; subsequently those of the posterior, and lastly the Clarke columns. Towards the fourth month the prolongations of Deithers begin to appear distinct. About the sixth month the cortical portion of the cells begins to present a fibrillar aspect. At the time of birth they present the structure of adult cells, only they are smaller. They never contain pigmentation-granulations, which induces the belief that these granulations proceed from degeneration. M. Vignal has also studied the development of the nerve-fibres of the spinal cord. He believes them to be cellular prolongations (axis-cylinder) covered by cells of a special character secreting myelin. According to this author, neuroglia is composed of some of the primitive medullary cells. Their evolution is effected in a certain way, while the other primitive medullary cells develop into nerve-cells. It is impossible for us to enter into the details of their evolution. M. Vignal clearly indicates the measures necessary to be taken in order to follow step by step the evolution of the primitive cells of the mesoblast into nerve-cells and neuroglia-cells. There are eight plates to this memoir, which represent the gradual transformation of the elements of the spinal cord and of the spinal cord itself.

Two memoirs by M. Malassez follow the one by M. Vignal described above. One is on the camera lucida for microscopical drawing; the other is on the mi-

crotome of Roy, a well-known English physiologist. Until the art of photographing microscopical preparations is greatly improved, the camera lucida will continue to be the instrument in general use. Microscopic photography is only occasionally useful, and needs considerable experience. A camera lucida for microscopical drawing must fulfil many conditions. There is one especially important, with reference to the angle formed by the ray proceeding from the preparation and by another from the paper used for drawing. This angle is ninety degrees in Wollaston's and Amici's camera lucida, from fifteen to eighteen degrees in Nachet's, Milne-Edwards's, etc. When the angle is at ninety degrees either the microscope or the paper must be placed in a position which renders working at ease impossible. Another disadvantage is that, in order to prevent the drawing from being considerably magnified, a complicated optical instrument must be used. With those of an angle of fifteen or eighteen degrees the drawing is magnified in one particular direction: a square is changed into a trapeze, a circle into an oval. M. Malassez has studied this question, and proposes different methods for remedying the faulty conditions. He advises that the camera lucida in which the reflection falls on a transparent glass should be abandoned, because so many luminous rays are lost; also frequently the object reflected is double. Those in which the image is reflected on a metallic mirror M. Malassez also condemns: the reflection is too quickly dimmed. He recommends the exclusive use of the camera lucida made with prisms. He prefers those of Doyère and Milne-Edwards, in which the large prism is movable and a maximum angle of forty-five degrees can be reached. The microscope is bent backward to an angle of forty-five degrees; the image reflected on to the paper placed behind the microscope preserves its accurate proportions. The position in which the paper and the microscope are placed prevents fatigue to the worker, and is the position adopted where there are a great many preparations to examine. In those exceptional cases where the objects to be drawn float in fluid and therefore shift about when the microscope is on an incline, the angle of the camera lucida should be made more acute and reduced to an angle of fifteen or eighteen degrees (the smallest angle with which reflection can be obtained). The drawing-paper should be placed by the side of the microscope at the same angle as that of the camera lucida: the images by these means are not distorted.

Roy's microtome has been modified by M. Malassez, and considerably improved thereby. It is much more easily used,—sufficiently so to become generally used in public laboratories, where such instruments are required as do not demand any special skill on the part of the worker, and also which do not quickly get out of order. With this microtome the substance to be cut is fixed to one end of the rectangular copper slab, perpendicularly placed on a small horizontal board. The razor is fixed on to a movable piece of copper, attached by a vice at the opposite extremity of the copper slab. This is moved downward as required. The movement is regulated by a lever acting on a dentated wheel. M. Malassez has made the downward movement automatic. This is effected by drawing back the razor after a section has been made. A spring brings back the lever into position. The length of the lever is just sufficient to forward the dentated wheel one tooth. Sections of one-hundredth of a millimetre are thus obtained, or two-hundredths of a millimetre, according to the length of the thread of the vice. Unlike the original microtome, the copper slab which supports the mechanism holding the substance to be cut is movable. This alteration, which enables sections to be made in alcohol, is a great advantage in the case of soft tissues, which are so easily torn. M. Malassez substitutes methylene chloride for ether, generally employed for congelation. The former body produces a lower degree of cold. It is not necessary to use the spray with the methylene chloride, as it is gaseous at the ordinary temperature. When the tap of the receptacle is opened, and the methylene chloride directed on to the slab on which is the substance for cutting, this latter is immediately frozen, and a number of sections extending over a considerable area can be made with ease. M. Malassez has also modified the manner of fixing the razor, which renders the angle of inclination more suitable for making sections. All these improvements of Mr. Roy's microtome render it an excellent instrument for laboratory use. The sec-

tions made with it are not so fine as those obtained by sliding microtomes; but as sections of one-hundredth of a millimetre are generally thin enough, and the excessive care required in using the sliding microtome is not necessary with Roy's, it is preferable. A large number of sections can be made in a few minutes, either with fresh tissues or on hardened tissues.

The last memoir contained in the volume is by M. Suchard, "On the Corpuscles of Tact in the Genital Organs and the Conjunctiva." The author arrives at the following conclusions. In the conjunctiva of calves corpuscles of Pacini are present, as those histologists who have studied the question admit. In the conjunctiva of man the corpuscles are rounded, like those of Meissner. In the mucous membrane of the male genital organs of the human subject the corpuscles are composite Meissner's corpuscles, remarkable from their size and the net-work of nerves which terminate in them. The corpuscles in the mucous membrane of the genital organs of the rabbit are prolonged, but apparently belonging to the ordinary type of Meissner's tact-corpuscles. A large number of Pacini's corpuscles, varying in size, are also observed in the mucous membrane of rabbits' genital organs. These different corpuscles can all be ranked among the simple type. Nerves terminate in them according to the general law, by free extremities between the cellular elements.

As we are speaking of the work done at the Collége de France this last year, we cannot leave the subject without devoting a short space to M. Marey's researches. It is well known that he has perfected the different graphic methods. At the present time he is engaged in making researches on the different positions the body assumes in walking, either carrying a weight or not; also the influence of different kinds of boots and shoes on the position assumed either in walking or jumping. The importance and bearing of these researches are evident, both for pedestrians and soldiers.

Part of M. Marey's researches were published last year in the Transactions of the Paris Académie des Sciences. Let me here briefly describe the method adopted by M. Marey in making his researches. Instantaneous photography is a great adjuvant. The apparatus used obtains in a second forty photographs. An interval of six-hundredths of a second elapses between each photograph, and the photograph is taken in four-hundredths of a second. In order to succeed in taking photographs of this nature, evidently special conditions are necessary. The apparatus is thus constituted: a plate of bromide-gelatin with two obturators, one of which changes its place by a movement transmitted to it by the operator by means of an india-rubber inflator; the other obturator is a metal disk moved by an electrical motor and executing fifty rounds in a second. This disk is crenellated, which allows the light to pass through during a short space of time, just sufficient to leave an impression on the plate. This arrangement renders it impossible to photograph objects in their entirety; they would be a confused mass. M. Marey dresses the sitters in black velvet, and indicates by white lines and points the position of the bones. As the person executes the movements desired before a black velvet screen, the lines and points previously traced are solely reproduced on the photograph. Clear indications are thus obtained of the position each part of the body assumes during different moments of motion.

RATE OF LOSS OF MOTOR SENSIBILITY IN DIVIDED NERVES.

It is well known that when a nerve has been divided, after a few days it loses its motor sensibility (in a dog, four days after section); but it was never known in what progressive proportion this sensibility was lost. This has been determined by M. Quinquand. He cut the nerve of a limb; the extremity of the limb was attached to a dynamometer; the nerve was stimulated by an electrical current, and he ascertained the weight the limb was capable of lifting. He also observed that the motor force is not lessened until twenty-four hours after the section of the nerve. It then continues to diminish progressively during eighty hours after section, until the limb can barely lift a weight of five hundred grammes or even less. M. Quinquand draws attention to the necessity of appreciating the value of two phenomena involved in the result of these experiments: one proceeding from the loss of sensibility of the nerve, the other from the loss of muscular force. When the muscle is directly stimulated, it is easily

observed that the primary force is lessened. M. Quinquand has thus ascertained that the motor excitability of the peripheral end of the nerve is not increased immediately after section, but remains normal during twenty-four hours afterwards.

IMPROVEMENT IN ELECTRICAL ELEMENTS.

M. D'Arsonval, *chef du laboratoire* of M. Brown-Séquard at the Collége de France, has recently described several electrodes which cannot be polarized, and which will render incalculable service in making electro-physiological researches, especially as they can replace the polarizable electrodes ordinarily used in clinics. The electrodes made according to M. D'Arsonval's directions consist of a silver capsule containing melted silver chloride covered with chamois leather. In these electrodes silver chloride plays the part of zinc sulphate; but, as it is insoluble in water, it can be brought into contact with the tissues. Silver chloride can be replaced by dioxide of manganese and charcoal or peroxidized lead plates (the positive plates of accumulators). For studying living tissues, instead of ordinary needles those made of steel are used, and are coated with silver chloride by the following method. The needles are plunged into a strong solution of silver nitrate; when this is dried, into one of sodium chloride. Thus a layer of silver chloride is formed, which adheres to the needles on being melted after it has dried. M. D'Arsonval in his communication mentions a fact which alone shows the utility of his electrodes: electrotonus is manifested in nerves stimulated by these electrodes the same as with other electrodes, which proves that electrotonus is not produced by a secondary polarization resulting from the electrolytic effects of a current, as many have attempted to prove since Matteucci's experiments.

PARIS, June, 1885.

TRANSLATIONS.

DIGITAL EXPLORATION OF THE STOMACH.—In a case reported by Billroth before the Imperial Royal Medical Society of Vienna, of a girl of 19 years, who had swallowed in her sleep an artificial denture, it was found that the foreign body had passed into the stomach. Believing that it could not pass through the pylorus, Billroth performed laparotomy and gastrotomy, but could not find the denture even after drawing the stomach out of the wound. The wound was enlarged and the intestines examined, but in vain. The only part remaining unexplored was the posterior portion of the stomach, situated behind the gastro-splenic ligament towards the vertebral column. Introducing his hand into the stomach, the article sought for was found and removed. He then brought the gastric wound together with ligatures and cauterized it, and closed the abdominal wound. The patient recovered.

The case was reported in order to show where to search for a foreign body in future, and to demonstrate that the stomach cannot without great difficulty be brought outside of the abdominal wound. In attempting this the foreign body was carried back to the posterior portion of the stomach, where it at first escaped detection.—*Le Progrès Médical*, April 18.

TRICHLORACETIC ACID AS AN ANTISEPTIC.—In one- or two-per-cent. solutions trichloracetic acid is a powerful antiseptic, according to Dr. Filippowitch. It is a crystalline body of an agreeable odor, and soluble in alcohol and water. It coagulates albumen, and in concentrated solutions is caustic, and precipitates pepsin and peptones. It is a valuable dressing for putrefying and indolent wounds, and is said to be an excellent application for erysipelas. In dilute (one to two per cent.) solutions it has been used in gastric catarrh, in doses of two to five grains three times a day to an adult. Its use as a preventive against cholera has been suggested, in two- or three-grain doses, well diluted, three or four times a day.—*Gaz. Méd. de Paris.*

CAN TUBERCULOSIS BE COMMUNICATED BY VACCINATION?—Investigations made by Dr. J. Acker (*Centralblatt für Allgem. Gesundheitspflege*, December, 1884) upon some phthisical subjects, whose sputa contained abundant bacilli, showed that the vaccination-vesicle did not contain bacilli in its lymph. He believes, moreover, from other experiments, that even when bacilli are present no danger can arise from the very superficial wound of the skin made in vaccinating.

PHILADELPHIA
MEDICAL TIMES.

PHILADELPHIA, JUNE 27, 1885.

EDITORIAL.

SUMMER RESORTS FOR THE SICK POOR.

IT is a matter of common observation that the habit of taking a vacation by dwellers in our large cities is one that is growing in favor, and increasing numbers of those who are sufficiently well-to-do seek the mountain, plain, or sea-shore, and remain there during the summer. This is not due merely to fashion, or to the desire to escape the discomforts of dwelling in the hot city, or to the attractions of the summer resorts, although these are potent; but there is a growing conviction that there are conditions of city life which are inimical to health, and which are especially active during the heated term. This fact is known to none so well as to the physician who is a daily visitor to the homes of the poor, where he finds himself thwarted in the care of the sick by the bad hygiene of the surroundings, the improper food and miserable attendance, made tenfold more active for harm by the relaxing and exhausting effects of heat. Under such circumstances a change of air is often the one thing needful to turn the scale and convert impending failure into success; but it too often happens that to recommend a visit to the country only seems like mockery to the poor invalid.

It is a pleasure to know that the wants of such patients have not been neglected by the charitable in their schemes of practical benevolence. Our attention has been directed to one of the latest of the institutions for this purpose. The Sea-Side House for Invalid Women, better known as the "Mercer Memorial," is situated at Atlantic City, and is now open for the accommodation of invalid women of moderate means, not suffering from contagious disease. This building, one of the finest of its size in Atlantic City, is provided with every convenience for the care of sick women. Its sanitary arrangements are believed to be as nearly perfect as they can be made. It has a capacity for treating seventy-five patients, and has all the conveniences of a first-class hospital. The charge for medical attendance, medicines, nursing, and boarding is four dollars a week; and the railroads issue tickets at reduced rates. Application must be made before going to Atlantic City to any of the managers, or to Dr. William H. Bennett, who is the Physician in Charge.

The Children's Sea-Shore House at Atlantic City, also under the charge of Dr. Bennett, has been in operation for several years. It admits invalid children of both sexes, without regard to color, creed, or nationality, and has accommodations also for mothers with young children in cottages. Its charges are three dollars per week for a mother with either one or two children, and two dollars for children unaccompanied by mothers.

A cottage for the convalescent patients of the Friends' Asylum for the Insane, of this city, has just been opened at Atlantic City, under the care of Dr. J. C. Hall. It is known as Gurney Cottage. It is conveniently located, and admirably adapted for the purpose of treating cases of mental disease of mild type, in addition to convalescent patients from the Asylum.

A Cottage Sanitarium has been opened for patients with moderate means in the Adirondack region, near Saranac Lake, which promises to accomplish much good, under the charge of Dr. E. L. Trudeau.

Physicians, who appreciate the great good accomplished by these institutions, which are supported by voluntary contributions, are in good position to commend them to the attention of those who are

able and willing to aid in such humane and philanthropic work.

PROFESSOR HENLE.

BY the death of Friedrich Gustav Jacob Henle, Germany has lost one of her greatest and best-known anatomists, and the profession a man who served it nobly and well for nearly half a century. His early education was with Rudolphi and Johannes Müller, and in 1837 we find him a prosector and docent in Berlin. In 1840 he went to Zurich as Professor of Anatomy and Physiology, and in a few years was transferred to Heidelberg, and, in 1852, to Göttingen, where he labored until his death.

Henle is a curious instance of a man with a double reputation. We know him now as the learned anatomist whose great work is everywhere read and consulted. So familiar is his name in this department, and so many and valuable are the anatomical monographs and memoirs which he has published during the past forty years, that his early and important work is forgotten. We do not remember him as the profound and philosophical pathologist,—the founder, indeed, of rational pathology. And yet we can safely predict that in the years to come, when the history of medicine in the nineteenth century is written, Henle's fame will rest largely upon the fact that he was the first exponent of the germ theory of disease and the pioneer investigator in a department of medicine the extraordinary development of which characterizes this part of the century.

In a modest little volume entitled "Pathologische Untersuchungen," Berlin, 1840, the first section of which is devoted to the subjects of Miasm and Contagion, we have an exposition of the theory of infection as at present held,—not a mere sketch, but a full, detailed statement covering eighty-two pages. He lays down the reasons which compel him to think that "the material of contagion is not only organic and living, but is endowed with individual life, and in relation to the body is a parasitic organism." The whole chapter differs from any recent exposition of the doctrine of contagium animatum solely in paucity of illustrative facts which better methods of research have provided. As a possible explanation why the parasitic bodies are not seen in many diseases, he suggests that they may be too small for the microscopic powers then in use, or that they had the same degree of translucency as the tissues in which they lived. In the larger work, "Handbuch der rationellen Pathologie," Bd. ii., 1853, we find the same admirable presentation of the theory which he lived long enough to see established on a sure basis of fact.

THE DISPOSAL OF SEWAGE.

IN the very able paper by Col. Waring, which we have pleasure in laying before our readers, the Drainage Question in Philadelphia is discussed in a thorough manner that deserves and will command attention. He shows, first, that our low death-rate is mainly attributable to the porosity of the soil, and to the absence of overcrowding and of extreme poverty, and expresses the opinion that with proper hygiene and improved sanitary conditions the death-rate need not be more than eleven or twelve per thousand, instead of eighteen or twenty, as it is now; or, according to his calculation, our recognized and remediable sanitary faults cause seven thousand unnecessary annual deaths. One of the principal problems is how to supply the inhabitants with pure air to breathe, which, with dry air to live in, he considers the final outcome of the whole business of sanitary drainage.

The question of the disposal of sewage, which has been the great obstacle in the way of sanitarians, and which has led to such costly and unsatisfactory experiments in London and Paris, he shows to be,

after all, quite easy of solution. If the organic matter can be delivered from the sewers into a large watercourse before putrefaction occurs, it will be disposed of without difficulty by the fish, who are natural scavengers. This end may be attained by making proper house-connections and flushing the drains: by this means all organic matter can be made to traverse the sewer to its outlet in a city like Philadelphia in less than four hours, long before decomposition can occur.

The other suggestions in this valuable paper, concerning the faults of sanitation in our houses and the dangers of old cesspools and hidden vaults, and the means of correcting some of them, we commend to the attention of our readers.

NOTES FROM SPECIAL CORRESPONDENTS.

LONDON.

"SUPPORTED by Voluntary Contributions." This announcement, so commonly found on the front of our charitable institutions, was what most impressed an intelligent foreigner when he visited England. The hospitals and infirmaries of England are maintained without state aid. In making this statement it may be well to explain that there are also parochial sick asylums, now becoming numerous; but these are only for paupers. Such institutions are kept up out of the rates, and are under the management of the different Boards of Guardians, and supervised by the local government Board. They are utterly and essentially different in every way as to management from the institutions maintained by voluntary contributions. The parochial sick asylums are under the control of a medical superintendent, who has an assistant medical officer to help him. The other hospital is worked by a committee with a staff of honorary officers, with residents under the control of the honorary staff. The two have no points of resemblance except the treatment of sick persons. It has been at these hospitals, endowed by the gifts and legacies of benefactors, and further aided by voluntary contributions, that all medical research in this country has been hitherto conducted and carried on. Many have become medical schools, and with a full staff of teachers have provided the medical education of this country. As schools of medicine they have become famous, and so have become popular with the public; while the reputation gained by individual members of the staff at the hospital has commonly led to general recognition of his merits outside. Every ambitious young medical man strives his utmost to gain a foothold on the staff of a teaching hospital. Experience and reputation are there to be gained; while there are also students who, when launched in practice themselves, will call in their old teachers when a consultation becomes desirable. This has all become time-honored; but there is a change looming up. The cloud is no bigger than a man's hand, but it is there beyond dispute, all the same. The hospitals are all feeling the pinch of hard times. Many, like Guy's, draw a certain portion of their income from landed property. The depreciation in the value of land and the reduction of rents have told gravely on the income of Guy's and upon those similarly situated. That there is any prospect of land regaining its old value here may not be affirmed. It will never reach its old figure. Ready transit by rail from boundless inland areas once practically debarred from export by their distance from the seaboard has now enabled the up-country farmer to get his produce to market; means of preserving meat admit of the flesh of animals being brought from the farthest ends of the earth to the London markets.

All this is a heavy blow of permanent character to the British agriculturist, while a recurrence of bad seasons has exercised a most injurious, if temporary, influence upon the agricultural interest. Land-owners have been giving back heavy percentages of rent to their impoverished tenants, and of late have often been glad to let farms vacated by bankrupt tenants to those who would take them at nominal rents, or otherwise have had to take them in hand themselves in order to prevent their going out of cultivation. Land-owners are pinched, and are curtailing their expenditures on all hands. They cannot be in a position to subscribe freely to starving charities for a long time to come. Business, too, has been very slack for some time, and the subscriptions of commercial firms have been falling off. Until there is a revival of trade, there is no prospect of increased subscriptions from business firms. The only subscribers, almost, who are still in a financial position to continue their subscriptions in full are persons deriving an income from investments; and even all these are not without embarrassment. Still, practically they are but little affected by diminution of income. Another force is in action, however, in their case at present, which will tell grievously on their contributions to our existing charities. The fact is that, socially, we are almost at civil war in England. The conflict betwixt capital and labor, betwixt employer and employed, has recently been both widened and embittered. The womankind are dragged

into or have invaded the arena of conflict. The domestic of to-day is not what the domestic of five years ago was, as housekeepers know only too well. There is a distinctly aggressive attitude on the part of the wage-class which manifests itself painfully in the behavior of our domestics. There is the same perfunctory discharge of duty, the same punctilious assertion of rights, as is found in the present day in all ranks of life. The spirit of shirking is only too manifest everywhere. To discharge duties so as to draw the pay is the order of the day. To do anything above or outside the stipulated contract is not to be expected nowadays.

But there is something more in the attitude of the women of the wage-class. They are losing their self-respect, and with that many valuable elements of character. The number of respectable-looking women and girls now to be found in public-houses is appalling. In this matter the English women of to-day compare most unfavorably with their mothers and grandmothers. Self-respect kept decent women out of the public house up to a recent time, and to be seen in a tavern meant quite recently that a woman had broken away irrevocably from the more reputable section of her sex. Now no such line of demarcation is recognized. And, what is worse, there is other demoralization on foot. How comes it that legislation for the protection of the young is now so urgently demanded? Hitherto girls have been regarded as competent (with the help of certain social regulations) to protect their person; but now they must be protected by Act of Parliament. In a bill which is soon to be presented to our elected legislators, and which has already passed the Lords, the power to give consent as to her person is to be taken away from a girl till her fifteenth birthday. Hitherto after her thirteenth birthday a girl could give consent. But the early immorality of the present is such that old regulations are insufficient for present needs. A man may not abduct a girl until her sixteenth year, but she may absent herself from the paternal roof and lead a life of open immorality with impunity as soon as she has entered upon her thirteenth year. The Bishop of Peterborough put it straight when he told the story of a girl of fifteen who was living in a den of infamy. Her father consulted the authorities, who told him they could do nothing for him. The spiritual peer went on, "If the woman had stolen his spoons, instead of his daughter, he could have gone to the nearest magistrate and taken out a search-warrant and recovered his stolen property." So, as parents of the lower orders have lost the control over their daughters, the law has to come to the rescue. A few years ago the woman who detained in her brothel the child of an indignant parent would have stood a strong chance of being lynched, her establishment sacked, and the girl taken away by violence and restored to her parents. But the moral degradation which has been steadily progressing among the lower orders has removed all risk of such prompt measures being adopted. While the bishop made this appalling statement, an account appeared in the *Times* of a poor mother seeking her daughter in one of these dens of infamy, with the consequence that the keeper flung her down-stairs and broke her leg. She, poor thing, had no "lawful excuse" for being on his premises.

A lady writer in the daily press speaks of "the disgraceful stigma that at present rests upon England of being the land of wretched child-harlots." There is every reason to apprehend that by means of modern inventions the morality of girls in all classes, and most of all in the wage-classes, is being steadily sapped; with a further result that, passing themselves off for chaste when conscious that such is not the case, the girls of to-day are gradually growing in self-assertion and audacity. They adopt an attitude to their employers which is most offensive. This, of course, is most seen in our domestics, who come nearest to us, but it runs through the whole class. The consequence is that, with the waxing demand for domestics, as stated before, we in England are almost at civil war. Of course we have not yet reached the state which has become developed in the United States, and, what is more, we have no wish to reach it! But the friction is becoming so great that a strong feeling of antipathy is growing up on all sides, in towns and the country alike, betwixt mistresses and servants. The attitude of our domestics is tightly tying the purse-strings of charitably-disposed ladies, who have always been so far good upholders of our various institutions "supported by voluntary contributions." The prospects of such institutions are indeed clouded. Many of our hospitals have been of late dipping freely into their invested funds to meet a falling revenue. Indeed, King's College Hospital has almost exhausted its investments; and what will become of it no one can tell, the boldest speculator not seeing his way as to what will be the end of it all. So dire is its strait that last Sunday a young man, attired fantastically as a "forester," carrying a leather pouch, and bearing a pine staff (like a broomstick) with a green-flannel purse at the end of it, solicited coppers from the passing omnibuses at Oxford Circus,—whether with the knowledge of the authorities of King's College Hospital and the Temperance Hospital or not is unknown,—but there he was, and that was his plea. What with decreasing rents, lowered incomes, and the antagonism which is growing up betwixt mistress and servant cutting down the gifts of charitable ladies, our hospitals are falling upon evil days,—and this, too, at a time when the demand upon them is waxing keener and

keener. The present legislation about the franchise has led the House of Lords to decide that "medical relief shall disqualify the applicant as a voter." To accept medical relief from the state will deprive a man of the franchise, consequently the resort to charitable institutions, wherever they exist and are available, will be greater than ever. But with an increasing demand upon them, and a reduced income, what can these institutions do? It is quite clear that a change is coming over them, and that, too, before long. The old hospital will have to undergo some transformation to meet modern requirements, and the sooner the governing bodies begin to put their houses in order the better.

One thing is clear, and that is that the classes who resort to the hospitals must do something for their support. To a certain extent, the old hospitals must become self-supporting; and, then, how about medical teaching at them? The patient who pays may be in a position to protest against being utilized for purposes not strictly connected with his treatment. To be set up in order that a lot of youths eager for self-improvement may learn the signs of pneumonia may not be quite this patient's idea of justice to himself, and he may remonstrate, very naturally. What is to be done? The objection has been raised here already, and met with difficulty. With you it is a familiar matter, I am told. (A patient of mine recently at the hospital had been an inmate of a Chicago hospital not long ago. His attitude caused me to have him removed from my wards without delay.) Beggars must not be choosers; and if physical examination is still to be thoroughly taught, it will have to be done at the parochial institutions. The same may be said of pathology. And if these two great matters of medical education are taken away from the present teaching institutions, what remains will soon follow. It is abundantly clear the direction which things are taking at the present time. But what a revolution this will involve! Admitting that the medical superintendents of our sick-asylums are picked men (and many will well repay a series of visits paid with them when going their wards,—a matter in which I can offer my personal testimony), still, it can scarcely be claimed for them that they are competent to take up medical teaching, even if they had the time to devote thereto. The discharge of their own proper work is quite enough, without any teaching duties. The necessary consequence will be, that, if teaching is to be carried on at the national or parochial hospitals, arrangements will have to be made accordingly. What a revolution this will cause amidst the medical profession! If scientific teaching has to be conducted at a university, and clinical instruction be sought wherever it is to be had, the grand old schools of the metropolis, as well as their smaller and newer rivals, will have to look to their honors. They will return more or less to their primitive function,—the healing of the sick purely, with little connection with medical education.

If such changes be wrought,—and it seems most probable they will,—then the hospitals supported by voluntary contributions and helped by fragments from the patients will have to withdraw from their present proud position into humbler life. The man with the eye to the main chance will go where the student goes; and if the student goes to a parochial sick asylum, thither must he also wend his way. Then think of the patronage wielded by the Board of Guardians as to physicians and surgeons. To canvass a Board, instead of making friends among the staff,—will the choice be better or worse? To what extent will these honorary officers be under the rule of the Guardians, or, in other words, under the control of the rate-payers? Will the staff have more or less of their own way when they have to deal with the elected representatives of the rate-payers than with the chosen custodians of a private fund? What will be the effect of such radical change upon the material of the staff? The whole vista lengthens out into limitless space, with any amount of potentialities. Whatever may be the result as regards medical teaching, it is quite clear that a profound change will come over the dreams of our old hospitals. If medical relief disfranchises a man, all who value their vote will make friends with the private hospitals, will add their mite to that of the benevolent, and between the two keep the institutions afloat. But with paying patients will come a great change in many ways. And the outcome of all will be that what are now general hospitals will probably compromise with specialism, and so be enabled to keep themselves before the public.

But, however the problem of the future is to be solved, the large general hospitals as at present conducted will seriously suffer. It is to be sincerely hoped that the estrangement which is undoubtedly growing up betwixt mistress and maid will not widen into revengeful feelings which will dry up the well-springs of charity,—though of this perhaps the hope is almost vain. And the attitude of the impure products of enfeebled paternal authority in the streets exercises no corrective influences over the growing dislike on the part of cultured woman to the brazened venal Venus who jostles her on the side-walks. Social problems are always complex, and matters apparently without any connection are not unfrequently closely linked together in reality. The humbler classes must tone down their present attitude towards those in the higher social strata if they wish these latter to help them in their hour of need. To strike against their employer whenever an opportunity offers is scarcely the

way to encourage capitalists to engage in business involving the employment of many men. To allow their daughters to swarm on the streets, or as domestics to worry their mistresses out of their lives, is not just the attitude to encourage charity when the time has arrived that the entrance of a man's name upon the relieving officer's book for medical relief will cost him his vote. The day of trial to the institutions supported by voluntary contributions is near at hand, and those who benefit by them must be considerate to those who contribute to keep them up, if these institutions are to be maintained in anything like their present form.

J. MILNER FOTHERGILL, M.D.

BOSTON.

MR. EDITOR,—The annual influx of medical visitors to our city has come and gone, and the hand-shakings and exchange of social and professional news incidental to the annual meeting of the Massachusetts Medical Society are over for another year. When one looks back a few years in the history of this Society, and recalls the low state of its financial exchequer, of its scientific work, and of its *esprit de corps*, and compares it in all these respects with the flourishing organization of to-day, he can but be struck with the change. The dead limbs have been trimmed off, and a vigorous new and healthy growth is to be seen.

The place of meeting, which the committee has arranged now for the third year, is particularly fortunate. The Massachusetts Institute of Technology, one of the soundest of our younger institutions of learning, has always manifested a warm interest in the medical profession, and has opened its doors most hospitably to receive us. Huntington Hall, the large auditorium of the building, capable of seating eight hundred or nine hundred persons, amphitheatrical in form, and admirable in optic and acoustic properties, has been used for all the meetings. The lower rooms of the building have been used for the exhibition of apparatus of various kinds, which is always made a prominent feature of our yearly gatherings.

The meeting opened June 9. In the morning the Fellows were made welcome at the Massachusetts General, the City, and the Children's Hospitals, where they made the visits with the surgeons and physicians in the wards, and afterwards witnessed some operations. The papers read at the sessions of this and the following day comprised the following:

"The Pathogenesis of Certain Affections of the Skin," by Dr. George N. Tilden, of Boston; "Consanguineous Marriages: their Effect upon Offspring," by Dr. Charles F. Withington, of Boston; "Labor complicated by Fibroids," by Dr. J. R. Chadwick, of Boston; "The Climatic Treatment of Phthisis," by Dr. Harold Williams, of Boston; "How a Lesion of the Brain results in Aphasia," by Dr. Morton Prince, of Boston; "The Relation of Insanity to Certain Nervous Affections," by Dr. Henry R. Stedman, of Boston; "Cremation in its Sanitary Aspects," by Dr. John O. Marble, of Worcester; "Diagnosis and Treatment of Occipito-Posterior Positions," by Dr. William L. Richardson, of Boston; and "The Influence of Ovariotomy on Surgery," by Dr. John Homans, of Boston. You may be struck by the number of papers furnished by Boston. Others have been so, likewise.

A very clever exhibition of obstetrical apparatus was made, in part by manufacturers and dealers, and in part by individual members of the Society, who contributed devices of their own invention and construction. A zealous specialist in pulmonary troubles brought on and exhibited Dr. Wilson's (of Brooklyn) Pneumatic Cabinet, wherein you can sit and have the air a little rarefied by an exhausting-pump, while by a mouth-piece is aspirated corrosive sublimate or other germicides to seek out and annihilate any stray bacillus which, unluckily for you, has found lodgment in your pulmonary alveolar spaces.

Dr. Henry I. Bowditch, known wherever thoracentesis has been practised, contrived an ingenious little exhibit to show the "evolution of the stethoscope." The first instrument of Laennec, made in 1816, was shown, and all its developments, in children, grandchildren, and collateral branches, down to the consummation in the double Cammann instrument of the present day. Among the series was the (at the time) new-fangled instrument belonging to Dr. Jacob Bigelow, with a plessimeter attachment, immortalized by Holmes in "The Stethoscope Song:"

> "The doctors being very sore,
> A stethoscope they did devise
> That had a rammer to clear the bore,
> With a knob at the end to kill the flies."

The Annual Discourse was given at noon on Wednesday by Dr. Franklin K. Paddock, of Pittsfield, and was upon the subject of antisepsis in surgery. He showed the natural tendency that wounds have to heal, and said that the antiseptic treatment owed its signal success to its removing all obstacles of decomposition, etc., which might impede that process. By antiseptic surgery many wounds that would once have been considered incurable have been successfully cured. The object of the address was to urge the adoption of this system upon the rank and file of the profession. In Germany it is demanded by the people, and in a recent case failure to employ it subjected a practitioner to suit for criminal negligence. Like Jenner's discovery of vaccination, its great practical value depends upon the universality and completeness of its application. Germs do not necessarily prevent the healing of wounds,

though their tendency is to do so. Putrefaction can be prevented by deterring the germs from entering wounds, and this is done by antiseptic treatment. The details of this system were then gone into, with emphasis upon personal cleanliness of the operator's hands and instruments. The various antiseptics were considered, especially four,—carbolic acid, corrosive sublimate, chloride of zinc, and iodoform. The difficulty of managing a spray in country practice was admitted, and means of replacing it were considered, with the conclusion that for most operations they could be relied upon, as the spray was not a *sine qua non* of antiseptic surgery.

Following this address came the annual dinner, at which some seven hundred Fellows sat down. Our Fellows include now some ten or twelve sisters, who during the last year have availed themselves of the opportunity granted them a year ago to become members on equal terms with the men. The "female Fellows" (in our inexperience we have hardly got a name for them yet) attended the meetings and the dinner in good relative form, and, despite the furious discussion that their admission called forth a year ago, were treated with courtesy and consideration on all sides.

The after-dinner exercises were presided over by Dr. Robert Amory, of this city, and among those who spoke were Dr. Charles D. Homans, President of the Society, Dr. Roosa, of New York, Dr. Walcott, late of the State Board of Health, Lunacy, and Charity (to whom I will return in a moment), Dr. H. W. Williams, Speaker Marden, of our State Senate, Hon. F. T. Greenhalgh, His Honor Mayor O'Brien, and others. The Mayor expressed his sense of obligation to the corps of physicians whom he had called in shortly after his inauguration into office to consult with the Board of Health as to methods of purifying the city from filth in view of the possible approach of cholera this summer. The police had been put at the service of this Board, and His Honor expressed the opinion that the city was never in a better condition to meet an epidemic of cholera than at the present time. He paid a high compliment to the work of the health officers in connection with the treatment of smallpox. The figures on this point are so striking that I cannot forbear quoting them. During the decade ending in 1850 there were 457 deaths from this disease; from 1850 to 1860, 762; from 1860 to 1870, 630; in the four years from 1870 to 1873, inclusive, 1100; and in the eleven years since 1874, only 26.

The strains of "Auld Lang Syne" brought the dinner to a close, and with the dinner ended the celebration of the one-hundred-and-fourth anniversary of our State Society.

Some years ago, three of our State Commissions were consolidated in one Board, known as that of "Health, Lunacy, and Charity." This was done against the protest of some of our ablest authorities on matters of public health, for the multiform duties of the Board were such as to give little hope that any individual member could make himself familiar with all its widely-differing duties. One by one the best men have dropped out of it, and the places have become in great measure political spoil, until now it is stated without contradiction that the committee on lunacy is entirely made up of men without any technical knowledge of the subject. Only two out of the nine members of the Board are practitioners of medicine at all. For the last few years whispers have been circulating that one of the departments superintended by this Board was not administered in the interests of morality, and after much delay the facts were brought to light and the offender removed. In all the thankless tasks which fell to his share as a member of this Board, Dr. Walcott, one of the two medical members, has been faithful to his duty and zealous for the public interest. His term has just expired, and he has failed to receive a reappointment. The enthusiastic reception which he received at the dinner when he was called to address so many of his professional brethren who knew that he had suffered for "righteousness' sake" must have been in the highest degree gratifying to him. One of the few good things that the old Board has done was to secure the passage of a law against the adulteration of food and drugs. Massachusetts is the only State which now enforces such laws.

A word further, suggested by the figures quoted above concerning smallpox. We have had this spring about half a dozen cases of this disease, apparently developed from three or four different sources. At least a careful study of the epidemic has failed to show any connection between that number of the cases and any of the others. Every case has been removed at once to the hospital at West Roxbury, which, far from being a pest-house in appearance, more nearly resembles an artistic suburban school-house. Here the policy of the city physician has been to give the patients, one and all, the most luxurious treatment at his command. The patients are given anything (in reason) that they ask for, and doubtless many of the poorer classes receive more dainties of food and drink than they ever saw before in their lives. But the desired effect has been produced. The quality of the accommodations and the treatment are pretty generally known among the lower classes of the city, and there is now no reluctance shown by any one who is taken with the disease to go there for treatment. Ignorance, prejudice, and fear, which formerly led to the concealment of the disease and thus imperilled a whole community, are now disarmed, and prompt information,

removal, and isolation have borne good fruit in the stamping out of an epidemic which might have attained formidable proportions.

C. F. W.

June 11, 1885.

PROCEEDINGS OF SOCIETIES.

THE MEDICAL SOCIETY OF THE STATE OF PENNSYLVANIA.

Second Day.

THE report of the Committee on Medical Education being in order, the chairman, Dr. Jackson, of Philadelphia, reported a series of resolutions recommending that, with regard to the right to practise medicine, the sole power of granting a license to practise in Pennsylvania be vested in a single Board, which should have no connection with any corporation engaged in medical teaching; that the proceedings of the Board be a matter of record, open to public inspection; and that the medical profession should nominate to the Governor a list of persons qualified to perform the duties of the Board, from which he shall appoint the required number. It was further recommended that a committee be appointed to prepare, in accordance with the views of the Association, a bill to be presented to the Legislature incorporating the above resolutions. The discussion was long and spirited, but the resolutions were finally adopted.

Dr. Taylor, of Luzerne County, read a report of the recent epidemic at Plymouth, and this was followed by a paper from Drs. French and Shakespeare upon the same subject.*

The Nominating Committee presented its report, which was adopted:

The following were nominated for the respective offices:

President.—E. A. Wood, M.D., Allegheny County.

Vice-Presidents.—Hiram McGowen, M.D., Dauphin County; E. J. Russ, M.D., Elk County; A. H. Shaefer, M.D., Juniata County; C. C. Halsey, M.D., Susquehanna County.

Permanent Secretary.—W. B. Atkinson, M.D., Philadelphia.

Recording Secretary.—G. D. Nutt, M.D., Lycoming County.

Corresponding Secretary.—J. H. Musser, M.D., Philadelphia.

Treasurer.—Benjamin Lee, M.D., Philadelphia.

Additional Members of the Committee on Publication.—T. H. Helsby, M.D., Lycoming County; Edward Jackson, M.D., Philadelphia; G. W. Weaver, M.D., Luzerne County.

Members of the Judicial Council.—J. L. Stewart, M.D., Erie County; S. S. Schultz, M.D., Montour County; Henry H. Smith, M.D., Philadelphia.

* The substance of these communications was given to the readers of the TIMES in the last issue, p. 654.

Chairman of Committee of Arrangements for next Meeting.—T. H. Helsby, M.D., Williamsport.

Williamsport was selected as the place of holding the next annual meeting, on the first Wednesday in June, 1886.

The Address in Medicine was read by Dr. Edward T. Bruen, of Philadelphia.

Commencing with some remarks upon pathology and etiology, he said that in tubercular disease it has been established that a micro-organism, the bacillus of tuberculosis, is constantly present. The inoculability of the tubercular material from pure cultures has also been proved, and its causal importance is claimed by an increasing number of clinicians and pathologists. It is, however, a fact that healthy tissues can resist the inroads of the microbe: therefore an active constitutional predisposition or acquired ill health is a constant source of menace. But there also exist cases of abdominal tuberculosis without pulmonary lesion, and even cases with cheesy deposit in the lungs, in which the bacillus cannot be detected, however careful the search. These cases radiate foci of infection only through the lymphatic channels, and in this differ from a tubercular case in which the bacilli exist, for in the latter case the entire system may be involved. There also exists a form of interstitial phthisis known as pneumonokoniosis, or artisan's phthisis, in which the appearances are often very similar to the admittedly-tubercular forms, but which are minus the bacillus.

A very brief allusion was made to the subject of cholera. The opinion of its communicability by means of fluid media was warmly supported, and is proved by modern research, —the same argument applying as is used to explain the spread of diphtheria, which is a disease known to be communicable by fluid media as well as directly from individual to individual. Koch seems to have demonstrated a specific cholera bacillus, and the same demonstration of a specific microbic poison is sought by some for diphtheria. Possibly in both cases the exact poison is yet to be discovered.

The propriety of boiling the drinking-water is unquestionable; and certain disinfectants lessen the active force of the virus, as corrosive sublimate or the sulphate of copper. The free use of water in sewers, and the burning of the dejecta, were recommended.

In albuminuria, among the symptoms the importance of high arterial tension, when continuous, cannot be overestimated, since Bright's disease has two aspects, the renal and the cardio-vascular. The views of the late Dr. Mahomed upon this subject were cited,—viz., that acute or chronic blood-poisoning forms the first step in the process. This is followed by an increased arterial pressure, and consequently by functional hyperæmia of the kidney, the chief excretory organ of the body.

When high arterial tension is inaugurated, a chill, constipation, or an excessive amount of the poison may increase the hyperæmia to a more severe inflammation, and this gives rise to albuminuria by further impeding the circulation through the Malpighian tufts.

When the change is more chronic, albumen may be only occasionally present, and that in small amounts, but cardio-vascular changes produced by high arterial tension develop, the vessels thicken, and the heart becomes hypertrophied and its nutrition impaired.

Albuminuria may also occur by rapidly-advancing changes in the capsules until they strangle the vessels they contain, or the outer-lobular changes may be considerable, and bring about a like result by compressing the tubular plexus.

The real diagnostic question was, in each case, not, Is there albuminuria? but, Is the kidney doing well its functional work of elimination?—and the study of the heterogeneous elements of the renal secretion by the specific gravity and quantitative analysis is supremely important. The duration of cases of Bright's disease was considered as really much longer than is customarily thought, but no albuminuria can be physiological if persistent.

The causes of albuminuria not due to serious renal mischief were thought to coincide with the times of increased fulness of blood in the kidney, which is produced by general causes, such as effects of food and fasting, of upright posture as compared with the horizontal, the warmth of bed *versus* exposure of the surface, of exercise *versus* rest. Nervous forms of albuminuria may occur in young adults at puberty, due to excessive irritation of the genito-spinal centre with reflex cerebro-spinal symptoms. The common association of albuminuria with cases of ophthalmia is more frequently vaso-motor than due to renal disease; and Granville has shown that albuminuria can occur in elderly but intensely nervous persons, the force of irritation residing either within the cranium or at the cilio-spinal axis. Cystitis or gout may give rise to forms of albuminuria; and Granville was quoted as showing that there is no reason why, under the influence of nervous depression and vaso-motor disturbance, the kidneys should not become œdematous in the same manner as in an hysterical patient.

In testing for albumen, a preference was expressed for the heat with nitric acid and the picric-acid tests. The former will detect one part of albumen in from six thousand to seven thousand parts of urine. The ferro-cyanide of potassium and acidulated brine test will detect one in from six thousand to seven thousand parts of urine; also potassio-mercuric iodide, picric acid, and sodium tungstate, one in twenty thousand parts of urine. The picric-acid test was discussed at length, and methods of avoiding error described.

A review of the subject of the operative management of pulmonary cavities was given, and its proper scope defined. The recognition of pneumothorax was stated as being much simplified by using a silver dollar as a plexor and plessimeter, and then noting the clear metallic sound produced. This sign vanishes if an external fistula is produced or the internal opening is closed.

Some personal views were expressed as to the diagnosis of pericardial friction. Over the pericardium the sounds (*a*) are synchronous with the movements rather than the sounds of the heart; (*b*) they are superficial sounds, often accompanied by a fremitus; (*c*) change of posture modifies the murmur; (*d*) the alterations common to the walls of the heart in endocardial disease are absent.

The above were usually noted, but especial importance was laid upon the location of maximum intensity of a murmur in pericarditis which does not correspond with a valve-point. The pericardial murmurs also change their focus of maximum intensity very often.

In alluding to antipyrine, it was described as undoubtedly efficient as an agent to reduce the temperature, which continued to fall for about six hours after the exhibition of one or two doses. The objection to its use was the profuse, exhausting perspirations to which it gives rise, and it also produced a depressing effect upon the heart, though the latter is less than the depressant effect produced by others of the carbolic-acid series. The usual dose employed by the speaker was ten grains, as the strength of antipyrine is about twice that of quinine. Nitro-glycerin had been found valuable in lessening albuminuria associated with increased arterial tension, but its use must be watched, since it is possible that the reduction of arterial tension may be so great as to impair the cardiac power so essential to perfect circulation in renal processes, and thus albuminuria from feeble circulation would occur. Nitro-glycerin was also considered as very useful in renal asthma. Caffeine is a safe cardiac stimulant and diuretic. It is capable of increasing the force of the systole, but does not bring about a slowing of the pulse. The dose should range from eight to twelve grains daily. A peculiar fanciful delirium, like that produced by excessive amounts of belladonna, was described as an occasional symptom when caffeine had been used continuously. The mental equilibrium is speedily restored when the use of the drug is suspended.

Reference was made to the use of hyoscine. It had been shown by Dr. H. C. Wood, of Philadelphia, to be a safe cerebral and spinal sedative. The dose was about one-hundredth of a grain. The virtues of cocaine were commented upon, and the special applicability of the wine of coca in cases of chronic alcoholism and nervous prostration was discussed.

The address closed with some observations

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on dosage and the possible effects of small doses long continued, especially when remedies had been used as alteratives and tonics.

Dr. Henry H. Smith, of Philadelphia, read a paper "On the Non-Contagiousness of Cholera Asiatica." Cholera is a disease which, although well known in China two thousand years before the Christian era, and of which an uninterrupted chain of evidence has been preserved to the present day, is yet unsettled as to its exciting cause, there being a variety of opinions, differing in accordance with the stand-point of the observer.

The speaker stated that he had participated in the investigation and treatment of every epidemic of cholera in Philadelphia since its first appearance, in 1832, spent many hours in the post-mortem study of the intestines of patients dead with cholera, and had never suffered from this exposure. He stated that he was, from his own experience, convinced of the non-contagiousness of the disorder, and that most of the distinguished practitioners of a former period in Philadelphia—as Chapman, Horner, Hodge, Jackson, Condie, Coates, the elder Pepper, Wood, Goddard, and Neill—were also non-contagionists. After citing numerous European authorities of the same opinion, he quoted statistics furnished by Sir William Gull, of London, showing that in the epidemics of 1848 and 1865 the deaths from cholera in London were always greatest after pay-day among the working classes, this being largely due to the free use of alcoholic drinks, it being supposed that brandy was a preventive and panacea, while, on the contrary, its use was followed by a depression of the nervous system that predisposed a person to an attack. Alluding to the wide discussion of the comma-shaped bacillus of Koch as the exciting cause of cholera, the lecturer stated that there were many who doubted it, as it had never been proved to be capable of creating the disease in man, and that the results of Dr. Ferran's inoculation of comma-bacilli were discredited by the French Academy, and that there were opponents of Koch's views in the French Commission sent to Egypt in 1883 to investigate cholera, foremost among whom was Professor Strause, of Munich. He also cited Von Pettenkofer as recommending "the abolition of all sanitary precautions to check the advance of cholera as irrational, and like the posting of sentries to stop the burst of the monsoon," so well satisfied was he of the non-contagiousness of the disorder.

Speaking of Koch's address before the Imperial Board of Health at Berlin, the speaker said that it would doubtless surprise many to learn that Dr. Koch knew of no germicide for cholera, and that when asked as to the use of his discovery to the practitioner he replied, "It will put an end to the fearful squandering of disinfectants, and millions will not again, as in the last epidemic at Berlin, be poured into gutters and cesspools without the slightest advantage."

After this rapid summary of facts and opinions proving the non-contagiousness of cholera, the paper closed by stating that, whether this disease was or was not admitted to be contagious, it was all-important to the public health to observe strictly all the usual sanitary laws in reference especially to the purity of water, proper drainage and the removal of excreta, proper food and clothing, and the avoidance of fatigue by all engaged in attendance on the sick; and then if cholera should come this summer, which, judging by its past course, was very doubtful, it was not likely that the epidemic would be as severe as those through which so many physicians had practised and lived without undue anxiety.

A paper entitled "A New Method in the Treatment of the Alcohol Habit" was read by William F. Waugh, M.D., of Philadelphia.

The treatment of acute alcoholism is generally successful, but, except in a very few cases, the patient relapses into inebriation and finally dies a drunkard.

The disease is not, however, essentially incurable, for cases do sometimes recover permanently. The causes of the relapses are—

1. Previously-existing disease, which led to drink.

2. Overwork, especially when combined with illness.

3. Gastric catarrh, due to alcohol.

4. Catarrh of the mouth, due to the same cause. (This is the form which is popularly cured by using liquor as a gargle instead of drinking it.)

5. The depression due to the withdrawal of the accustomed stimulus.

In the first and second classes, the recognition of the cause affords the indication for treatment.

In the third class, the remedies recommended are hot water with soda before meals, oxide of silver, oxide of zinc or bismuth following, and minute doses of ipecacuanha to restore the secretion of the digestive glands.

In the fourth and fifth classes, the use of coca is recommended, in the form of a masticatory, to obtain the local effect on the mouth, as well as the constitutional effect in relieving the depression. The object is to substitute for the alcohol habit the harmless habit of chewing coca. The food should be carefully regulated, and should at first consist of raw oysters or beef, with capsicum and vinegar, pickled tripe or pig's feet.

If the patient pass the point when he still desires to be cured, and is unwilling to make an effort, he should be put under restraint,—preferably in an institution where he could be compelled to earn his livelihood instead of spending the time in enervating idleness.

Dr. Spencer M. Free, of Dagus Mines, read a paper on "Morphine in Cholera Infantum," in which the use of morphine was advocated in small doses in selected cases.

The Secretary presented a paper by Dr. A. Van Harlingen, on "Dermatitis Medicamentosa," which was read by title, in the absence of the author. (This subject is discussed by Dr. Van Harlingen in his "Report on the Progress of Dermatology" in the preceding number of this journal.)

Dr. J. V. Shoemaker, of Philadephia, presented a systematic and elaborate paper on the use of "Soaps especially Medicated in Diseases of the Skin," in which many new and reported useful combinations were proposed and discussed.

At the close of the afternoon exercises a visit was paid to the Lackawanna Hospital, on the invitation of the Board of Directors and the Medical Staff. In the evening the President, Dr. E. P. Allen, delivered the annual address, before a large audience, at the Court-House.

Third Day.—The Address in Obstetrics was read by title, as Dr. C. A. Rahter, of Harrisburg, who was appointed to deliver it, was absent.

Dr. John H. Packard, of Philadelphia, presented a new instrument for use after tracheotomy as a substitute for the tube. It was a skeleton wire instrument, modelled upon the general plan of the eye-speculum.

Dr. E. O. Shakespeare, chairman of Committee on the Communication from the American Medical Association relative to the appointment of State Examining Boards, presented a report recommending a reference of the whole subject to the Committee on Medical Education, which was adopted.

Dr. Charles Meigs Wilson read a paper advocating "Mechanical Dilatation of the Uterus" for many disorders which formerly were thought to need a serious surgical operation.

Dr. E. A. Wood, of Pittsburg, delivered the Address in Surgery, in which he strongly insisted upon the necessity of preliminary training for medical students.

Dr. Addinell Hewson, of Philadelphia, exhibited the electric light and explained its use in diagnosis.

Dr. Benjamin Lee read a paper entitled "*Nil Desperandum* in Spinal Caries."

He said, in substance, that there are two points that can never be too strongly insisted on in the treatment of spinal caries, or Pott's disease of the spine.

First. That it is *never too early* to begin with the employment of mechanical support of the most decided character; and, second, that it is *never too late.*

First. It is never too early. The disease is a surgical one, and must be treated surgically. To tamper with it by attempting to treat it medically, by giving tonics and anodynes, is both a crime and a blunder,—is as absurd as to try to treat a fracture of the thigh with Mrs. Winslow's Soothing Syrup.

The wearing of an artificial support, properly contrived, for a few months can do the patient no harm if the spine is not diseased, but neglect on the part of the physician to advise a resort to this means of treatment when such disease is present will lead to irreparable injury to the patient and a loss of prestige to the physician himself. The story will be repeated from house to house, and from gossip to gossip, how Dr. Langsam allowed Mrs. Goodmother's daughter to go on for a year with spinal disease, and never found out what was the matter till she told him herself. It is perfectly easy to recognize the disease long before any deformity shows itself. The principal signs are sudden attacks of cramping pain in the abdomen or sides, great stiffness on waking in the morning, and inability to stoop forward and touch the floor. There is not generally pain or tenderness in the back, and it is a great mistake to pronounce that there is nothing the matter with the spine because that symptom is absent. If the patient is able to walk, he will turn in one or both toes and hold his shoulders back and up rigidly. If an infant, it will scream on being moved and lifted. The disease often follows an attack of whooping-cough, and can even more frequently be traced to a fall or other injury.

Secondly. *It is never too late* to begin with the use of mechanical supports.

It is the greatest possible error to suppose that strength is needed on the part of the patient in order to bear the application of a surgical appliance. When the vital energies are slowly wasting away in consequence of a local source of irritation, the mechanical support is the plug which stops the leak. Without this, internal medication is as vain as the labors of the fifty daughters of King Danaus, condemned to expiate the awful crime of murdering their husbands on their nuptial night by filling eternally with water a vessel full of holes.

The following case amply illustrates the truth which the author wished to convey.

S. R. J., a boy 6 years old, was first seen by Dr. Lee January 7, 1884. He was suffering from spinal disease in the vertebræ of the neck, following whooping-cough two years before. The only treatment had been homœopathic globules given for supposed rheumatism. He was completely paralyzed from head to foot, was wasted almost to a skeleton, had a racking cough, breathed with great difficulty, and had so rapid a pulse that it could scarcely be counted. He screamed with agony on the slightest movement, and every touch gave him pain. The application of the brace was a task of great difficulty, on account of this extreme sensitiveness, but when it was once on he experienced an immediate sense of relief. One week later he

was eating and sleeping well, and could move the first two fingers of the right hand and the little finger of the left hand. At the end of the second week he could move his toes and put his hands above his head.

In three weeks more he had slight motion of the left leg. Two months from the time of the application of the support, which he wore night and day, he could hold up his head, and in three months more could walk alone.

Notwithstanding the formation of a large abscess in the neck, he has continued to improve in every respect up to the present time, and there is every reason to anticipate his entire recovery. This was simply one of the many cases which the doctor could cite to prove the truth of his second proposition; but one example would suffice.

Dr. G. G. Davis, of Philadelphia, read a paper describing the "Treatment of Palmar Abscess, Panaris, and other Inflammations of the Hand and Fingers."

Dr. H. R. Wharton, of Philadelphia, read a paper on "Osteotomy for the Correction of Deformities in the Lower Extremities."

Under the general remarks upon Osteotomy attention was directed to the two methods employed, the linear and cuneiform operation, and the preference given to the former where possible, as it consists in a simple section of the bone, and practically constitutes a subcutaneous operation, whereas the cuneiform operation, in which a wedge of bone is removed, necessitates an open wound, with its attending dangers.

The use of the osteotome or the saw rests with the choice of individual operators. The importance of making a full correction at the time of operation was insisted upon, especially if a fixed dressing be afterwards employed.

Among the causes which produce deformities for which osteotomy may be required are those arising from rachitis, from coxalgia, from badly-united fracture, or from unreduced dislocation, and of all these the vast majority of cases requiring operation are due to the first-named cause.

For the correction of angular deformities at the hip-joint resulting from coxalgia, Gant's modification of Adams's operation is to be preferred: that is, a section of the femur just below the lesser trochanter.

This operation is preferable because a section of the bone at this point secures its division at a locality where its structure is comparatively healthy; whereas its division through the diseased structures of the neck, if it still exists, is capable of renewing an active inflammation in tissues which are most susceptible to inflammatory accidents following traumatism.

Also, from the fact that the shaft of the femur can no longer be influenced by the action of the psoas magnus and iliacus muscles, the chances of correcting deformity are less when the section is made at this situation.

Adams's saw had, in the author's experience, formed a most satisfactory instrument, although some operators speak with equal favor of the use of the osteotome in performing these sections.

The fact that no case had resulted fatally in a large number of patients under the author's observation speaks well for the general safety of the operation. The results obtained as regards the correction of the deformity are most satisfactory. The various operations which had been devised for the correction of the deformity resulting from *genu valgum* were considered, and preference given to Mac-Ewen's operation, which consists of a linear section of the femur made from the inner side just above the epiphyseal line. The ease of its performance, the fact that the section is made at some distance above the knee-joint, so that the articular surfaces of the bone and the ligaments can sustain no injury, and the satisfactory results as regards the correction of the deformity, are all advantages which commend it above the various other operations.

The various osteotomies for the deformity resulting from *anchylosis of the knee-joint* were considered: that devised by Mr. Borwell, a linear section of the femur just above the knee-joint, combined with a section of the tibia through its tubercle, had been found most efficient in correcting the deformity.

In *genu varum*, a linear section of the tibia, fibula, and femur with an osteotome at the point of greatest curvature has been found a safe and efficient means of correcting the deformity.

In *tibial curves*, a linear osteotomy at the point of greatest curvature, or, in very aggravated cases, a number of linear osteotomies, or the removal of a wedge of bone, may be required to produce the requisite straightening.

The use of the plaster-of-Paris dressing to fix the parts after the operation was strongly recommended.

Dr. O. H. Allis, of Philadelphia, made some remarks on "Dislocation of the Shoulder," and, explaining its pathology, gave reasons for a guarded prognosis as to its recovery of complete functional utility.

Dr. W. D. Kearns, of Pittsburg, exhibited an "Improvement in Splints for Fracture of the Forearm."

This invention relates to an improvement in splints for fracture of the forearm or wrist, especially for that kind known as "Colles's fracture;" and it consists in providing the splint with a peculiar retroflexion for the purpose of giving greater ease to the patient and efficiency in causing the parts to knit and heal in proper shape.

He said, "In experience I have found that in many, if not most, cases of fracture of the

forearm or wrist the splints should be applied so that the metacarpal phalanges of the hand may be bent upwards from the plane of the arm at an angle of about one hundred and twenty-two degrees, and that it should be left as free to move as possible. This is about the natural inclination of the human hand, or that in which the posterior muscular tendons are most completely relaxed, and the continued maintenance of this relaxation of the several tendons, fasciæ, and ligaments is of paramount importance in the class of fractures above noted.

"It is the purpose of my invention to secure these points of advantage, and especially to effect a ready and comfortable maintenance of the required muscular relaxation of the extensors and flexors to their insertion along the phalanges, and of the muscles and fasciæ of the hand and thumb.

"I will now describe my improvement with reference to the accompanying drawings.

"As will be readily understood by one skilled in the art of surgery, it is the form and flexion of the dorsal splint which governs the position of the hand, and when the retroflexion is of the angle before noticed the hand will naturally assume this normal and easy position.

"The purpose of the immediate flexion of the dorsal splint is to permit the proper backward bend of the hand and consequent relaxation of the posterior muscular tendons without tension or pressure on the carpal bones.

"My improved splints may be applied to the arm by bandaging or in any of the well-known methods, and with or without interosseous pads to control the displacing influence of the pronator quadratus and supinator longus, as may be convenient. If desirable, the dorsal splint may be terminated at or near the line, and the fore part of the fingers left unconfined.

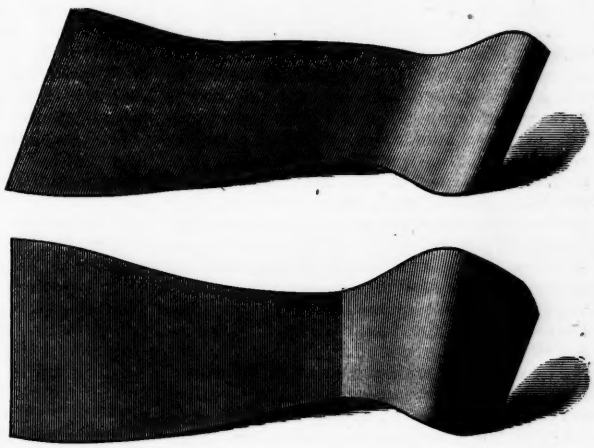
"The splints may be made of wood, hard rubber, tinned sheet-iron, zinc, or other suitable materials. Tin and zinc, though not always the best materials, are, however, the most convenient, because of the ease with which they may be bent to fit the arm and hand of the patient, and the readiness with which they may be procured in case of emergency.

"Having thus described my improvement so that others skilled in the art may manufacture and use it, my claim is:

"1. A dorsal splint for treating fracture of the forearm or wrist, having a suitable brachial surface retroflexed directly at the wrist, without substantial depression at that point, to extend over the metacarpal dorsal surface of the hand, at a retroflexed angle from the forearm, substantially as described.

"2. A palmar splint for treating fracture of the forearm or wrist, having a suitable brachial surface retroflexed beyond the flexors of the thumb and bent downward at or near the middle joint of the digital phalanges, substantially as described.

"3. The combination of a dorsal splint for treating fractures of the forearm or wrist, having a suitable brachial surface retroflexed directly at the wrist, without substantial depression at that point, to extend over the metacarpal dorsal surface of the hand at a retroflexed angle from the forearm, with a palmar splint made the substantial counterpart of the said dorsal splint, and provided with a retroflexed support for the palmar surface of the hand, substantially as described."



ENDORSEMENT OF FOREIGN DIPLOMAS.

Referring to the communication from the Lackawanna Society, Dr. P. D. Keyser offered a resolution which gave rise to some discussion, but was adopted. It declared it to be the sense of the Society that foreign diplomas requiring endorsement by colleges in this State could be properly endorsed only by the same kind of college, and that it is irregular to have homœopathic colleges to endorse a diploma other than that of their own school.

The President appointed the following gentlemen to read papers at the next meeting of the Association: In Medicine, Dr. J. V. Shoemaker, Philadelphia; in Obstetrics, Dr. R. Leonard, Mauch Chunk; in Surgery, Dr. H. L. Orth, Harrisburg; in Mental Disorders, Dr. John T. Carpenter, Pottsville; in Hygiene, Dr. T. M. Andrews, Philadelphia; and in

Laryngology, Dr. Charles E. Sajous, Philadelphia.

The Association was entertained at a reception and banquet given by the Lackawanna County Medical Society at the Wyoming Hotel on the 27th, which was a great success. After the close of the session an excursion was made to examine the mines in the neighborhood, upon invitation of the superintendent of the Delaware, Lackawanna and Western Railroad Company.

AMERICAN NEUROLOGICAL ASSOCIATION.

THE Eleventh Annual Meeting was held at the Academy of Medicine, New York, June 17, 18, and 19.

First Day, Afternoon Session.—Dr. Isaac Ott in the chair.

LOCATION OF A THERMAL CENTRE.

The Association was called to order by the retiring President, Dr. Ott, who spoke of the advance made by neurological science during the year, and then referred especially to the department in which he had been working,—viz., the determination of the centre for the control of the temperature of the body. Researches went to show that the temperature of the body was as much under the control of the nervous system as was the action of the heart. His own observations pointed to the anterior portion of the optic thalami as the location of this centre.

In the absence of the President-elect, Dr. Burt G. Wilder, the Vice-President, Dr. Leonard Weber, took the chair.

The reports of the Secretary and Treasurer, Dr. G. M. Hammond, and of the Council, were then read and accepted.

Dr. Mason's resignation as an active member of the Association was accepted, and he was elected associate member. Dr. Zenner, of Cincinnati, and Dr. A. M. Starr, of New York, were made active members.

On motion, a paper by Dr. C. K. Mills, entitled "The Brain of a Delusional Monomaniac who Killed Several Persons," was read by title.

Officers for the year 1886 were then nominated:

President.—Dr. C. K. Mills, of Philadelphia.

Vice-President.—Dr. V. P. Gibney, of New York.

Secretary and Treasurer.—Dr. R. W. Amidon, of New York.

Council.—Dr. George W. Jacoby and Dr. E. C. Séguin, of New York.

On motion, the Secretary was instructed to cast an affirmative ballot, which he did, and the chairman declared the gentlemen named elected.

A CASE OF CHRONIC MYELITIS, WITH RECOVERY.

Dr. A. D. Rockwell, of New York, read a paper with this title. The case was that of a girl, aged 16 years, whom he first saw in consultation September 2, 1884. Three weeks previously she had gone on a Sunday-school excursion to the sea-shore, and sat down on a rock. Soon she felt cold, and walked with difficulty, and during the night the limbs became completely paralyzed, and she lost complete control of the sphincters of the rectum and bladder; incontinence of urine was supplemented by a severe attack of cystitis and pain; a bed-sore formed over the lumbar vertebræ, two inches in diameter. For two months the patient was nourished almost entirely on milk and champagne. No improvement in the symptoms. There was some loss of sensation in the lower limbs. The faradic current had been used without benefit. Galvanism was then applied to the legs and lower portion of the spine, and for three weeks there was no apparent change except in a healthier appearance of the bed-sore. At the end of the fourth week very faint muscular contractions were observed, and at the end of the following week the characters of these could be distinctly made out to be those of degeneration. From this time onward the patient steadily improved, regaining power over the bladder more rapidly than over the rectum. Within two months there was complete control over the urine and fæces. Treatment was continued for four months, at the end of which time there was perfect recovery, excepting slight weakness in the flexors of the right leg. The case seemed to be clearly one of acute inflammation of the cord in the beginning, going on to degenerative softening or atrophy of the ganglion cells, the symptoms pointing to implication of the whole transverse area of the cord. The case was certainly very interesting with regard to treatment, four physicians besides himself having considered it hopeless, and treatment being persisted in only at the urgency of the girl's father.

Dr. E. C. Séguin said the case was an interesting one, and reminded him of several which he had seen of typical subacute poliomyelitis, the diagnosis being obscured by the weakness of the sphincters and slight dulness of sensibility. He believed that was all there was in this case; there was not absolute anæsthesia. He thought this case would come under the category of somewhat modified polio-myelitis, with some extension around the gray matter. It certainly could not be brought forward as an example of cure of myelitis transversa. It left our unfavorable prognosis of that disease unchanged. He referred to a case of apparent diffuse myelitis of the cord, principally of the anterior horns, seen with Dr. Delafield, the patient having completely recovered within three years. Dr. Rockwell's case was particularly interesting with regard

to treatment: while there had been time for spontaneous recovery, he had no doubt that galvanism had been of great service in expediting the cure.

Dr. Rockwell remarked that in this case there was complete paralysis of both the bladder and rectum. He had seen a number of cases of recovery from polio-myelitis anterior.

Dr. Starr asked with regard to the details of the treatment, and Dr. Birdsall asked with regard to the tendon reflex, and the distribution of the paralysis and of disturbance of sensation.

Dr. Rockwell replied to the questions asked, and said there was absolute loss of muscular contractility in all the groups of the muscles of the legs; the sensory symptoms were confined to the toes; there was absence of patellar reflex, which had now returned.

Dr. Gray, of Brooklyn, said it depended upon what was regarded as evidence of chronic myelitis as to whether or not a cure could be effected. After all, we knew very little about myelitis. We could diagnosticate a myelitis of the anterior horns, and of the columns of Burdach or locomotor ataxia, and we could diagnosticate myelitis of the lateral paraminal columns; but experimental and pathological observations went to show that there were many other columns in the cord which were functionally distinct from one another. Then with regard to what should be considered a chronic case, perhaps opinions would differ. According to his observation, recovery in chronic cases was not so rare as Dr. Rockwell seemed to think. He mentioned an instance of paralysis of the lower limbs in which over a year elapsed before recovery was established. Sometimes cases were quiescent for a period, when suddenly improvement would follow the use of electricity after failure of other agents.

Dr. Rockwell said that of course the exact pathological condition which existed in his case could not be decided positively, but it was very gratifying to observe the results, which were apparently due to the treatment.

NEW METHODS OF STAINING IN MICROSCOPICAL WORK.

Dr. Allen M. Starr was invited to read his inaugural thesis on this subject. He described the following methods, pointing out their comparative value, and presented microscopical slides illustrative of each: the hæmatoxylon method; the acid fuchsin method; Dr. Séguin's modification of the anilin blue method; Salis's double stain with methyl blue and acid fuchsin; and, lastly, the saffranin stain. Each method had its special advantages, but, on the whole, the first two named were the best. They were superior in all respects to the old carmine method.

The paper was discussed by Dr. Séguin and others.

ON THE USE OF OSMIC ACID IN PERIPHERAL NEURALGIAS.

At the evening session Dr. George W. Jacoby, of New York, read a paper on this subject, first reviewing the observations of Neuber, Eulenberg, etc. In all, about fifty cases of peripheral neuralgias had been treated by this method by different writers. Eulenberg had obtained very good results, there being, out of twelve cases, three cured, four benefited, five unaffected. Other cases so treated had given even better results. Dr. Jacoby used a one-per-cent. solution of osmic acid in water; of this, half a gramme to a gramme was injected. The acid should be dispensed only in a dark bottle, and a small quantity prescribed at a time. It caused a smarting, burning sensation when injected hypodermically, the pain generally subsiding after a few seconds. No constitutional symptoms were produced. There was sometimes puffiness over the seat of puncture. If various branch nerves were affected, it was necessary to make an injection over each branch, but the results were more likely to be beneficial if only a single branch were affected. Of a series of eighteen cases of peripheral neuralgia so treated, Dr. Jacoby gave the details of three. Of the eighteen cases, eight were cured and some others benefited. Sciatica seemed to present the better chance of recovery by this method, and the older cases seemed more amenable to treatment than the more recent, an observation opposed to that of a German physician. In one case hypodermic injection over the radial nerve caused pain to extend down the arm, and paralysis was present the next morning. It was true the patient had slept on the arm during the night, but Dr. Jacoby was inclined to attribute the paralysis to the injection of osmic acid, for French observers had noticed paralysis following injections of ether on several ocasions.

The conclusions drawn were that in osmic acid we have a remedy which is of service in certain cases of peripheral neuralgia; its action localized is frequently beneficial, but its use is not altogether free from danger: it is dangerous to implicate a motor nerve during the injection.

Dr. Sachs, by invitation, said that his experience with osmic acid in peripheral neuralgias had been only partially satisfactory. He had witnessed the treatment at the hands of Eulenberg, and believed that in about one-third of the cases no benefit whatever was observed. In some a cure was effected after failure by electricity and various other remedies. One point which he observed was that the injection caused no pain whatever. But Dr. Sachs's experience with the drug obtained in this country had been quite different, for it always caused severe pain on injection, and was liable even to give rise to abscess.

Dr. E. C. Séguin had used osmic acid in the

manner indicated, but he had had some experience with this general plan of treatment. He mentioned some cases in which treatment by injections of nitrate of silver or other agents had been more or less successful, and he was disposed to attribute the result to counter-irritation, perhaps by the excitement of an abscess. He had also caused paralysis of sensation of the upper lip by injections of chloroform for trigeminal neuralgia, and the same accident had occurred at the hands of a friend. He knew of no case in which motor paralysis had occurred.

Dr. Jacoby, in closing the discussion, said that he was not quite ready to accept the explanation of the benefit derived on the ground that it was a counter-irritant. Perhaps the fact that the nerve-tissue was changed in color in the living subject, as well as in the post-mortem subject, by injections of osmic acid would point to some other mode of action.

Second Day, Afternoon Session.—The President, Burt G. Wilder, M.D., in the chair.

REPORT OF TWO CASES OF SPINA BIFIDA CURED; ONE FOLLOWED BY HYDROCEPHALUS.

Dr. V. P. Gibney read the history of these two cases, one of which was reported in the proceedings of the New York Pathological Society last winter. In the second case, a child, the spinal tumor was injected with the 1 to 1000 glycerin fluid, and the tumor was thus caused to disappear entirely. After the cure the child died (of cholera infantum, it was said), and no post-mortem examination could be obtained.

ON THE USE OF STRYCHNINE IN NERVOUS DISEASES.

Dr. Gray, of Brooklyn, read a paper with this title, and said a paper read by Dr. Jewell, of Chicago, on the use of large doses of strychnine in certain nervous diseases, had prompted him to make observations in this direction. He had prescribed strychnine in many cases of myelitis, but only in two truly acute cases, in which the drug was not well borne. In one case of transverse myelitis the dose was increased from one-fiftieth of a grain up to one-twenty-fifth of a grain, and after four days, without warning, alarming symptoms of strychnine-poisoning developed, and it was difficult to save the patient's life. In one other case also alarming toxic symptoms developed after giving about an equal amount. In five cases of progressive muscular atrophy the strychnine acted as a stimulant, but no real improvement took place. The drug seemed to be of benefit in certain chronic cases; but he would never risk giving it in larger doses than one-twentieth of a grain. Dr. Jewell had recommended it even in one-tenth or one-eighth grain doses; but Dr. Gray regarded this as dangerous.

Dr. Dana had used large doses of strychnine in certain cases of neurasthenia with benefit, giving in a few cases nearly a grain of the drug a day, divided into three doses.

Dr. Séguin recommended the use of strychnine hypodermically, thus avoiding danger of the cumulative effects, or the collection of the drug in pills in the alimentary tract. He had used it in large doses in some cases, and in some it had effected a cure.

The President then read his address on

PARONYMY VERSUS HETERONYMY AS NEURONYMIC PRINCIPLES.

It was proposed to discard all vernacular names; to make a selection of the shorter technical, classical ones; to abbreviate some by omission of unessential words and others by substitution of prefixes for adjectives. The number of terms used in the different languages to express different parts of the brain amounted to more than nine thousand, while the necessary number amounted to little over five hundred. What the author proposed was, as far as possible, to have each part of the neuron or central nervous system receive a name consisting of a single Latin word, and that for each such Latin name there likewise be found or made an English equivalent—not a translation, but a paronyme; and, further, that in obtaining these names, Latin and English, due regard be had both to exististing nomenclature and the established rules of etymological conversion. These Latin words and paronymes would be readily understood when they appeared either in Latin, Italian, Spanish, French, English, or German.

Third Day, Afternoon Session.—Dr. E. C. Spitzka read a paper entitled

THE RELATION BETWEEN THE SYMPTOMS AND THE LESIONS OF POSTERIOR SPINAL SCLEROSIS.

In his concluding remarks the author said, "While it must be admitted that the primary lesion of tabes is competent for each affected level of the root-zones and great horns to produce all the characteristic symptoms of tabes referable to that level, yet in the extent and distribution of the consecutive lesions we have valuable guides to the extent, severity, and duration of the primary disturbance, and we may attribute to the following special disturbances the ensuing degeneration of the tracts whose functions are abolished or diminished:

"1. That of the column of Goll, to the disturbance of muscular sense in the lower extremities.

"2. That of the comma-shaped initial bands of the column of Burdach, to the corresponding disturbances in the upper extremities.

"3. That of the triangular area bordering on the periphery of the cord and its posterior root entry, to the rarer analgesic development.

"4. That of the column of Clark and direct cerebellar tract, to the disturbed space sense."

The paper was discussed by Dr. E. C. Séguin.

A NEW NOMENCLATURE.

Dr. Burt G. Wilder then demonstrated a seldom-described artery (a. termatica), and made suggestions as to the names of the principal encephalic arteries. The artery referred to he found always to arise from the anterior or præcommunicant, and he also stated that the latter-named artery was often absent, the branches which it joined together being fused, and from within the fork so formed the artery termatica sprang.

Dr. Wilder also demonstrated two little-known cerebral fissures, and made suggestions as to fissural and gyral names. The first fissure was described only by Italian authors, the name in Latin being *fissura inflecta*. The second was the fissure called by Owen the basirhinal, and Dr. Wilder thought it had important morphological significance.

The next paper was entitled

TWO CASES OF FRIEDREICH'S DISEASE.

The author, Dr. Wharton Sinkler, of Philadelphia, being absent, it was read by Dr. G. B. Massey. The symptoms present in the two cases were nearly typical of Friedreich's disease, but were not congenital. There was no syphilitic history.

The paper was discussed by Drs. Séguin, Amidon, and others.

Dr. George W. Jacoby presented a galvanometer invented by Dr. Rondosch; and specimens of brain-section by Dr. Schmidt, of New Orleans, were exhibited.

Third Day, Evening Session.—Dr. E. C. Spitzka presented a brain-monstrosity found in a child which had reached the age of 2½ years. There were a number of deformities of the limbs, besides those in the brain, where there was an unequal development and limited displacement of parts.

Dr. Spitzka also presented specimens prepared after Gudden's atrophy method.

The President exhibited specimens illustrating the form and extent of the adult aula; the non-extension of the rima to the tip of the medicornu; the enlargement, yet complete circumscription, of the porta in an alinjected hydrencephal; the fimbrial revert and its relations to the prosoplex; the continuity of the diacœlian endyma from the mesial surface of the thalamus over the habena to the ditæle. He also presented specimens illustrating the extent of the insula or island of Reil in the porpoise, dog, chimpanzee, and man.

A CONTRIBUTION TO THE PATHOLOGY OF THE CEREBELLUM.

Dr. E. C. Séguin read a paper with this title, and related the history of the case of a man whose first symptoms appeared about 1857, and ten years later it appeared he had epileptiform or epileptoid attacks, headache, typical cerebellar inco-ordination, no distinct paralysis or ataxia, nystagmus, and increased patellar reflex. These symptoms remained stationary from 1871 until a short time before death (1885). Dr. Séguin made a diagnosis of disease, probably a tumor, of the superior cerebellar vermix. There was no history of syphilis.

The autopsy showed extensive atheroma of the cerebral arteries in patches, yellow in color, and of the type considered significant of syphilis. But this disease, he thought, could be excluded. There was a very considerable cyst of the superior vermix, extending at least an inch into the right hemisphere of the cerebellum, and pressing upon the floor of the fourth ventricle.

The paper was discussed by Drs. Amidon, Gray, Dana, and others.

Dr. Bauduy, of St. Louis, then read some

NOTES ON HYDROCHLORATE OF COCAINE.

The author thought this drug of special value in the treatment of melancholia, and also of other nervous affections. He administered it hypodermically in about one-grain doses. Its beneficial action on the melancholic was often almost miraculous and immediate. A cocaine habit, like the opium habit, was liable to be formed, and it would readily take the place of the opium habit. The antidote for the drug was morphine.

The Society adjourned to meet at about the same time next year, at the call of the Council.

NEW YORK ACADEMY OF MEDICINE.

A STATED meeting was held May 21, 1885, the President, A. JACOBI, M.D., in the chair.

OBSERVATIONS ON THE TREATMENT (MEDICAL AND SURGICAL) OF ACUTE PERITONITIS. BY T. H. BURCHARD, M.D.

The author said his object in writing the paper was to embody in a single article those questions which had proved most perplexing to him in the treatment of cases of acute peritonitis. He quoted statistics going to show that the death-rate in acute peritonitis is about fifty or sixty per cent., and is from twenty to thirty per cent. higher with the so-called idiopathic cases excluded. Believing that this mortality is unnecessarily high, he had thought it well to formulate the methods of practice already known, but which are not yet generally accepted by the profession.

The author considered his subject under the heads Causes, Natural Tendencies or Symptoms, and Mode of Death.

The causes of peritonitis are pretty well recognized: the rarity of idiopathic peritonitis is now generally admitted. According

to clinical and pathological observations, the causes of death are collapse and asthenia; but asthenia might be more intelligibly expressed by heart and respiratory failure.

The necessity for recognizing the cause of an attack of acute peritonitis in its incipiency, before the development of excessive tympanites, is evident. The diagnosis of a local lesion amenable to surgical treatment being demonstrated, surgical relief should be rendered at the earliest possible moment. Dr. Burchard referred to six fatal cases of peritonitis which had come under his observation and had already been reported, in five of which an autopsy demonstrated the correctness of the diagnosis of perforation of the vermiform appendix. Observation would justify one in making the statement that all foreign substances (solid, liquid, or gaseous,) of an irritating nature when introduced into the peritoneal cavity would inevitably and rapidly produce acute inflammation. If such an irritation existed elsewhere in the body, sound surgical treatment would indicate early removal. The same treatment is indicated, he thought, in the case of the peritoneal cavity. The words of Marion Sims, uttered in this hall a few years ago, pointed out the future treatment of these cases. The author referred to some experiments on the peritoneum and intestines of dogs going to show the tolerance of these organs to interference when proper precautions are observed. He also gave the condensed histories of a large number of cases of acute peritonitis in which surgical interference had been practised, and then gave the details of a case which occurred in his own practice, that of a colored man in whom there was omental abscess with agglutination of the peritoneum and intestines to the abdominal walls. The patient recovered from the operation.

Regarding the medical treatment, no drug is of greater service than opium; but it is often administered without a sufficient degree of discrimination. All cases do not develop gradually and show only slight constitutional disturbance. It was especially in the traumatic cases that there was shock and sudden collapse, and here, the vaso-motor system and the heart being affected unfavorably, opium, even in moderate doses, was poorly borne. In such cases the drug should never be administered without first carefully examining the heart, and guarding its effects by a combination with atropine and digitalis. Hypostatic pneumonia, which is so liable to occur in the progress of the case, might necessitate the administration of opium at only prolonged intervals. Regarding the quantity of the drug to be administered, respect should be had to the effect rather than to the amount. Dr. Burchard preferred the hypodermic use of morphine, as in this way one knew that he was getting the full benefit of the drug. Opium sometimes passes by the intestine without being absorbed. The tolerance of opium of patients suffering from peritonitis is well known, yet he had found that morphine administered hypodermically often produced its effects in comparatively small amount; but in one case it was necessary to give over sixty grains in five days, twenty-seven grains of the morphine being given hypodermically in the first twenty-seven hours of the disease. He gave with it one-sixtieth to one-tenth of a grain of atropine.

The advantages of the ice-coil were pointed out, also those of a diet of peptonized milk. If tympanites were due to gas outside of the intestine, aspiration would be of marked advantage; but he did not consider pneumatic aspiration of the intestine safe. It is possible for turpentine stupes freely used to produce kidney-irritation.

Dr. A. L. LOOMIS said he was not a believer in idiopathic peritonitis. He had not seen a case in which he was unable to find some constitutional or local cause for the disease. We might group all cases of peritonitis under three heads,—namely, those in which the cause is constitutional in the form of blood-poisoning, those in which the cause is extension of inflammation from neighboring organs, and those in which some form of perforation takes place, including traumatic cases. He had never seen a case of peritonitis recover which had owed its origin to an escape of intestinal gases into the peritoneal cavity. Peritonitis due to this cause he recognized as a very fatal form of disease. Dr. Loomis pointed out the difficulty which often exists of determining what part of the intestine is affected even in localized peritonitis, for the relative position of the abdominal contents might be altered from previous inflammations, etc. But if the commencement of the peritonitis could be determined with exactitude, he would heartily endorse all that had been said in favor of laparotomy. Where there is perforation of the vermiform appendix there often exists localized peritonitis and fixed pain, which is increased on pressure. There is also arrest of abdominal respiration, and feebleness of heart-power which does not correspond to the amount of pain or the apparent gravity of the disease. When such symptoms came on rapidly or suddenly, Dr. Loomis thought we were justified in resorting to surgery with the hope of saving the patient a fatal peritonitis, which was likely to occur. If an operation were not performed, or if the symptoms did not yet point positively to perforation, the physician should stand by his patient prepared to perform the operation when the first signs of perforation should appear. Dr. Loomis had on several occasions pointed out to surgeons the indications for the use of the knife in acute peritonitis. Experience had shown that the peritoneum is not such a dangerous membrane to invade as it had formerly been regarded. If, however,

general peritonitis had developed, if there was shock and collapse, pulse at 160, and the respirations altogether thoracic, then an operation offered but little chance of success. It was in the early stage that the operation should be done if one wished to give his patient the best chances of recovery.

Dr. Loomis believed thoroughly in the opium-treatment of peritonitis, but with restrictions such as had been pointed out in the paper. It had been a long time since he had adopted the custom of guarding his first doses of opium with atropine. Later on in the disease it was not so necessary to combine atropine with the opium.

Dr. R. F. WEIR thought that during the past ten or fifteen years surgeons had taken a long stride in advance in the treatment of diseases of the abdomen, and especially in traumatic cases. Dr. Loomis, he thought, had struck the key-note when he stated that there is no such thing as idiopathic peritonitis. Dr. Weir thought that in no case of peritonitis should the patient be allowed to die without receiving the benefit of an exploratory operation. He agreed with Treves, that there is no meso-colon leading to connective tissue behind the peritoneum; perforations always induce effusion into the peritoneal cavity. He called attention to the importance of earlier interference in so-called perityphlitic abscess. Surgeons should not wait until they are able to withdraw pus with the aspirator-needle, before cutting down and establishing drainage. In traumatic cases it is difficult to determine whether or not the patient is simply in a state of collapse, whether there is escape of the intestinal contents, or active hemorrhage. But the comparative safety of exploratory incision of the abdominal cavity justifies us, in such cases, in opening the peritoneum. He referred to the success of two operations under such circumstances, —one being performed by Mickulicz and the other by Kocher. He was entirely in accord with the author of the paper as to the importance of an early operation.

The PRESIDENT said it was a question in the mind of the general practitioner whether in every case of perityphlitis an early operation should be resorted to. He believed that we were not all fully prepared to operate at once, even though the diagnosis might be satisfactorily made, and for the reason that in a large number of cases the local inflammation did not extend. We knew of recoveries, too, in cases in which perityphlitis became a general peritonitis. For the general practitioner it certainly was a responsible position to take to decide the question whether an operation should be done at once, or whether we should wait for some time. He had met with just such a case within the last two weeks,—that of a boy, 15 years of age, who gave a history of perityphlitis,—there being sudden pain, local swelling in the right inguinal region, some dulness on percussion, slight elevation of the thigh, moderate amount of fever, absence of collapse. In such a case the question would be raised, Should an operation be performed at once? The patient was given morphine with atropine, and they applied ice constantly. The peritonitis became general, but the symptoms were not urgent. The temperature rose above 103° only once. There was pain over the abdomen, and thoracic respiration. He hesitated to recommend an operation, because the general condition of the patient seemed to justify a little more waiting. If in such a case death should occur, perhaps the physician might be reproached with not having proposed an operation.

The President heartily agreed with the statement that there were hardly any cases of idiopathic peritonitis. He was not prepared to say, even after the reading of this paper and hearing the discussion, that he would at once propose laparotomy in the class of cases mentioned. But he would propose it if peritonitis had set in suddenly after an attack of perityphlitis and extended very fast. Dr. Loomis had said to operate when the first sign of perforation made its appearance, but perforation was frequently the first thing which occurred.

Dr. LOOMIS thought he had said that the surgeon should be prepared to operate in all of these cases as soon as the evidences of perforation became known. He should beg to differ from the statement that perforation was the beginning of a perityphlitis. He mentioned a case in which he saw the patient on a Thursday, when there were localized symptoms in the right iliac region, not severe, but the facies pointed to some serious trouble. On Friday the patient felt well and got up, but on Saturday there was sudden collapse, and death occurred with general peritonitis. Autopsy showed lymph about the local trouble of two or three days' formation, and evidence of later perforation and general peritonitis. Had an operation been done at first, the patient might have recovered.

The PRESIDENT asked Dr. Loomis if he did not sometimes find at autopsies evidence of smaller perforations preceding a large one which was the immediate cause of death. In some cases the lesser perforation or minor degree of inflammation constituted the only attack, but in others there finally developed symptoms of perforation, collapse, and death. This much was true, that the post-mortem appearances varied so greatly in different cases as to constitute conclusive evidence that the cases must have varied clinically.

Dr. WEIR remarked that in speaking of an early operation he did not mean that it was necessary to resort to laparotomy, but to the ordinary operation for perityphlitis, with the insertion of a drainage-tube.

Dr. LOOMIS had stated at the beginning of his remarks that there was no cause of peri-

tonitis which was so fatal as the escape of the intestinal gases into the peritoneal cavity. He could understand how the vermiform appendix might be plugged at its opening into the intestine, and ulcerations occur farther on which might set up an inflammation in the connective tissue, give rise to hardening, etc., and recovery finally take place; but when the ulceration was situated near enough to the intestine to cause an escape of the intestinal gases, he could not see how it would be possible for the patient to escape acute general peritonitis.

Dr. BURCHARD, in closing the discussion, said he had seen six cases of perityphlitis attended by perforation, in five of which he had made a post-mortem examination and verified the diagnosis. It was a peculiar fact in these cases, and was commonly true, as had been pointed out in the discussion, that prior to the perforation which caused death there had been one or more attacks of perityphlitis, and that he considered a very strong diagnostic mark. If we should find a patient in complete or partial collapse who had had preceding perityphlitis, he thought we would be justified in concluding that there was perforation, particularly if there had been previous constipation and the patient had been taking an active purge. If there were but very little collapse, he thought we would be justified in concluding that if perforation existed at all it was so minute that it could not be diagnosticated. If the collapse were profound, as it is in most cases, and developed rapidly, he thought we would be justified in inferring that there was perforation.

MISCELLANY.

ANALYSIS OF SCHUYLKILL WATER.—Prof. J. M. Mallet, of the University of Virginia, Prof. T. G. Wormley, of the University of Pennsylvania, and Prof. William H. Greene, of the Philadelphia High School, by direction of City Council, are now engaged in making an analysis of the Schuylkill River water, which promises to be the most careful and thorough examination of the water-supply of Philadelphia that has ever been made.

DR. BURNEY YEO has been elected by the Council of King's College to the new chair of Clinical Therapeutics. The Council has acted wisely in establishing a chair of such character, in our opinion, and the school is to be congratulated upon having one of the most active workers in that field to fill it.

W. R. WARNER & Co., of this city, received the first premium at the World's Exposition, New Orleans, for uniformity and solubility of their sugar-coated pills. This is the ninth World's Fair prize which has been awarded to them, and attests their excellence and reliability.

STATE BOARD OF HEALTH OF PENNSYLVANIA.—The Governor has appointed the following to constitute the State Board of Health: Col. William Ludlow, Benjamin Lee, M.D., Joseph F. Edwards, M.D., Pemberton A. Dudley, M.D., of Philadelphia, E. W. Germer, M.D., of Erie, and J. W. McClellan, M.D., of Pittsburg.

A REUNION of the ex-resident physicians of the Pennsylvania Hospital was held at the Department for the Sick, Philadelphia, June 18, a reception having been tendered them by the superintendent, Mr. Richard Cadbury. The idea was a very happy one, and the occasion was so much enjoyed that it was decided to meet again to form a permanent organization next November.

NOTES AND QUERIES.

ERRATA.

IN the report of the American Climatological Association, page 798, the statement concerning the mortality from phthisis pulmonalis in 1857 should have been 39.50 (instead of 33.93) per *ten* thousand of all classes of the population. The statistics were taken from the Massachusetts *Registration Reports;* not from the State Board of Health Reports.

OFFICIAL LIST

OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT U.S. ARMY FROM JUNE 7, 1885, TO JUNE 20, 1885.

MAJOR B. E. FRYER, SURGEON, U.S.A.—Ordinary leave of absence extended six months, from July 1, 1885, on surgeon's certificate of disability. S. O. 129, A. G. O., June 6, 1885.

The order directing MAJOR P. J. A. CLEARY, SURGEON, U.S.A., to change station from Fort Union, New Mexico, to Fort Lyon, Colorado, is revoked. S. O. 81, Department of Missouri, June 8, 1885.

CAPTAIN J. Y. PORTER, ASSISTANT-SURGEON.—Having been found incapacitated for active service by an Army Retiring Board, ordered to proceed to his home, and report by letter to the Adjutant-General of the Army. S. O. 136, A. G. O., June 15, 1885.

CAPTAIN CHARLES RICHARD, ASSISTANT-SURGEON.—Granted leave of absence for three days. S. O. 128, A. G. O., June 5, 1885.

FIRST-LIEUTENANT C. N. B. MACAULEY, ASSISTANT-SURGEON.—Relieved from duty at Fort Sisseton, Dakota Territory, and ordered for duty at Fort A. Lincoln, Dakota Territory. S. O. 61, Department of Dakota, June 5, 1885.

LIST OF CHANGES IN THE MEDICAL CORPS OF THE U.S. NAVY DURING THE WEEK ENDING JUNE 20, 1885.

ARTHUR, GEORGE, PASSED ASSISTANT-SURGEON.—Granted leave of absence for one year, with permission to leave the United States.

DEANE, C. W., PASSED ASSISTANT-SURGEON.—Granted leave of absence for three months.

CLEBORNE, C. J., MEDICAL INSPECTOR.—As member of Medical and Naval Examining Boards, Philadelphia, Pennsylvania, June 22, 1885.

LIPPINCOTT, GEORGE C., PASSED ASSISTANT-SURGEON.—Detached from temporary duty, Naval Academy, and waiting orders.

MACKIE, BENJ. S., SURGEON.—As member of Medical and Naval Examining Boards, Philadelphia, Pennsylvania, June 22, 1885.

SHAFER, JOSEPH.—Commissioned an Assistant-Surgeon, active list, June 12, 1885.